

Threats, Force Structures, and the Role of Air Power

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**NATALIE W. CRAWFORD
CHUNG-IN MOON**

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CONFERENCE PROCEEDINGS

Emerging Threats, Force Structures, and the Role of Air Power in Korea

CF-152-AF

Edited by

**NATALIE W. CRAWFORD
CHUNG-IN MOON**

Yonsei University / RAND

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PREFACE

North Korea's ballistic missile program, the Theater Missile Defense (TMD) debate, and ongoing discussions concerning South Korea's next-generation combat aircraft have combined to heighten awareness of the critical importance of aerospace power. In an effort to assess these and other related issues, the Air Power Program (APP) based at the Center for International Studies at Yonsei University, together with Project AIR FORCE (PAF) at RAND and the Pacific Century Institute, coorganized the Second International Air Power Conference on the theme, "Emerging Threats, Force Structures, and the Role of Air Power in South Korea," June 11–12, 1999, in Seoul.

The collaboration with Project AIR FORCE at RAND and the Pacific Century Institute began when the Air Power Program hosted the First International Air Power Conference in June 1998. Building on the progress made during the first conference, the second conference focused on the Republic of Korea's (ROK's) desirable force structure in the 21st century, the role of air and space power in shaping future deterrence and defense missions, the ballistic missile threat in the current and emerging strategic environment and options for responding to it, and private and public sector collaboration on long-term development of air power. The conference brought together a diverse group of experts—from academia, think tanks, relevant government ministries and agencies, and the services—and their interaction contributed significantly to the quality of presentations and discussions. This volume is a compilation of papers that were delivered at this conference.

We are pleased with the outcome of the conference and the high-quality papers compiled in this volume. The papers represent cutting-edge research analyzing emerging security trends, potential strategic threats, and optimal force structures for the ROK. This new thinking is of particular importance because throughout the Cold War, South Korea's strategic mind-set was dominated by the imperatives of land warfare. Indeed, so long as South Korea continues to confront a major military threat from the North, it can ill-afford to downgrade its ground forces or to ignore critical land-based missions. But in the long-term, particularly in the post-unification era, Korea must give serious consideration to the development of a new national security strategy and concomitant military doctrines. In this respect, the findings in this volume will have critical implications for Korea's national security, defense planning dynamics, force structuring modalities, and air defense modernization programs well into the 21st century.

On behalf of the coorganizers, the editors would like to express their sincere appreciation to the cosponsoring institutions—the Center for International Studies at Yonsei University, Project AIR FORCE at RAND, and the Pacific Century Institute. We also thank the leading scholars and experts from Korea and abroad who served as paper-givers, chairs, and discussants for their outstanding contributions. The conference would have not been possible without the generous support and encouragement of key individuals. We would like to acknowledge the contributions of Mr. Spencer S. Kim, president of CBOL; Mr. Kenneth Tuggle, president of the Pacific Century Institute; General Chun-taek Park, Chief of Staff of the ROK Air Force; General Ronald Fogleman (ret.), former Chief of Staff of the U.S. Air Force; General Chi Ryang Chang (ret.), former Chief of Staff of the ROK Air Force; Major General Yun-joo Kim (ret.); and Major General Sung-kuk Park. Dr. Byung-soo Kim, president of Yonsei University, Professor Pyung-Gil Chay, dean of the Graduate School of International Studies, and Professor Jong-ryn Mo, director of the Center for International Studies, have shown their personal interest in, and support of, the conference.

The editors would also like to acknowledge the efforts of Dr. Chung-min Lee, Dr. Han-kyu Park, Dr. Sung-hack Lim, Col. Tong-hak Kim, Lt. Col. Sung-pyo Hong, and Major Byung-chull Kang, who were involved in the project from its planning to the final stages. In addition,

numerous students and staff at the Center for International Studies and the Department of Political Science offered their assistance, for which the editors are most grateful. Dr. Lee and Major Kang deserve special commendation for their pivotal role in making the conference a success. We are also grateful to Ms. Rachel Swanger at RAND for her hard work in turning these conference proceedings into a wonderful edited volume.

Finally, the editors hope that this volume will make a small contribution toward the enhancement of air power studies in Korea and serve as a symbol of continuing cooperation among the Air Power Program at Yonsei University, Project AIR FORCE at RAND, and the Pacific Century Institute.

Natalie W. Crawford, RAND
Chung-in Moon, Yonsei University

PROJECT AIR FORCE

Project AIR FORCE, a division of RAND, is the Air Force federally funded research and development center (FFRDC) for studies and analysis. It provides the Air Force with independent analyses of policy alternatives affecting the development, employment, combat readiness, and support of current and future aerospace forces. Research is performed in four programs: Aerospace Force Development; Manpower, Personnel, and Training; Resource Management; and Strategy and Doctrine.

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CONTRIBUTORS

Dr. Bruce Bennett, Research Leader, Strategy, Force Planning & Counterproliferation, RAND.

Mr. Tae Hwan Cho, Director, Air and Space Division, Agency Defense Development.

Lt. Gen. Myong-Sang Choe (ret.), former Commandant of the Air Force College.

Ms. Natalie W. Crawford, Director, Project AIR FORCE and Vice President, RAND.

Dr. Paul K. Davis, Senior Scientist, RAND.

Gen. Ronald R. Fogleman, former Chief of Staff of the U.S. Air Force and Commander of the U.S. 7th Air Force.

Dr. Yong-Sup Han, Professor, National Defense University.

Lt. Col. Sung-pyo Hong, RMA Planning Office, Ministry of National Defense.

Dr. In-Taek Hyun, Professor of Political Science, Korea University.

Major Byung Chul Kang, ROK Air Force and Ph.D. candidate, Yonsei University.

Dr. Spencer Kim, President, CBOL Corporation.

Dr. Woosang Kim, Professor of Political Science, Sukmyung Women's University.

Dr. Benjamin S. Lambeth, Senior Staff Member, RAND.

Dr. Chung Min Lee, Professor of International Relations, Graduate School of International Studies, Yonsei University.

Dr. Jung-Hoon Lee, Professor of International Relations, Graduate School of International Studies, Yonsei University.

Dr. Chung-In Moon, Professor of Political Science and Director, Institute for Unification Studies, Yonsei University.

Dr. Thomas Morgan, Consultant, Institute for Foreign Policy Analysis, Former Chief Scientist for Counterproliferation Acquisition Office of the U.S. Secretary of Defense.

Maj. Gen. Sung-Kuk Park, Commander, Combat Development Group.

Introduction

AIR POWER: THE 21ST CENTURY CATALYST FOR PROGRESS, CHANGE, AND PROSPERITY

General Ronald R. Fogleman, USAF (Ret.)
Former Chief of Staff, USAF

“Location, location and location. . . . The three most important attributes of any piece of real estate in establishing its worth also loom large in the history and potential of a nation.”

LOCATION—TRANSPORTATION AND CIVILIZATIONS

Throughout history civilizations have been constrained and/or defined by their transportation infrastructures. For this reason most population centers first grew along rivers and seacoasts. With the coming of the Industrial Age, manufacturing complexes and the accompanying population centers sprang up along the full lines of interior rivers and streams. So long as the world's population could be contained and sustained in these regions, the traditional means of surface transportation, boat and roads, were adequate to service these cities. As man's knowledge of the world expanded and vital natural resources were discovered in far away corners of the world, a patchwork of transportation nets was put into place. Much of the impetus for canals and railways in the 19th century came from this dynamic. In the 20th century, particularly after the mass production of the internal combustion engine, national highway systems sprang up in the form of European autobahns, British motorways, and American interstate highways. Following the Second World War, commercial aviation moved to the fore and a system of international airways and airports helped shrink the globe.

The trend toward globalization in worldwide economies and the pressures of a world population looking to live and work in all parts of the world will lead to another fundamental change in transportation. Time will be of the essence. While this movement has been under way for the past 50 years, in the opening decades of the 21st century it will accelerate. The 21st century will be the aerospace century—with all that will mean to global intercourse in the economic and international affairs arena.

Another movement has been getting under way during the last half of 20th century. For most of the century, Americans, and much of the world, have been focused on Europe. America fought two world wars that had their origins in Europe. As we approach the close of the century, once again we see the world focused on a European conflict—hopefully this is a mere sideshow, a diversion of the international community's attention from what is destined to be the real area of focus for the 21st century—Asia. In short, for Americans the 20th century was the European century—the 21st century will be the Asian century—the move is already afoot.

LOCATION—TIMING AND TRENDS

The combination of these macro trends—a coming aerospace century combined with a century in which Asia will come to be the center of attention for the family of nations and their international structures—offers an unparalleled opportunity for Asia—and for Northeast Asia in particular.

Unfortunately, much of the focus on air and space power for the 21st century will continue to be on military applications in support of national and international security interests. At the same time we should not overlook the tremendous opportunities that will come from commercial endeavors—to include the vast potential for the national and regional economic growth and stability. It is the purpose of this introductory chapter to examine the history, potential, and promise of aviation in both its military and commercial dimensions in Northeast Asia.

LOCATION—AND THE CHANGES IN THE NATURE OF WAR

Air and space power will revolutionize warfare in the opening decades of the 21st century. Some will want to resist this basic truth—but to do so ignores the larger lessons of history. The history of warfare has been marked by a series of inventions and applications, “Ideas and Weapons,” as my old professor Bill Holley of Duke University used to say, which revolutionized the nature of warfare on an irregular but frequent schedule. The discipline of the Greek Phalanx combined with a thrusting weapon dominated the ancient world—only to be supplanted by the mobility of the Roman Legion. The invention of the stirrup took man on horseback from being a means of transportation to being an instrument of mass and shock on the battlefield when a mounted warrior was able to stay mounted while wielding a thrusting weapon in the form of a lance or saber. This combination was eventually neutralized by the long bow with its ability to allow a foe to stand off and deliver projectiles capable of bringing down the horse and penetrating the armor of the rider. This development was further enhanced by the introduction of gunpowder. From this invention came the whole array of personal and siege weapons of the Medieval Period.

Likewise, the transformation of navies from dependence on wind and sail to steam along with rifled guns and iron-clad vessels in the 19th century marked another major change in the nature of war. The first victory of an Asian fleet over a European fleet occurred in 1904 when the Japanese fleet exploiting the revolutionary nature of its ships defeated the Russian fleet. Great fleets were to dominate munitions expenditures throughout the first half of the 20th century and were clearly recognized as the “Coin of the Realm” for great power status.

With the advent of World War II we saw the next great revolution in military affairs as the aircraft changed the nature of warfare—forever. World War II began for the United States with a surprise attack by an armada of sea-based aircraft against the American Pacific Fleet as well as major shore-based facilities on Hawaii in December 1941. The war ended in August 1945 with another attack from the air when a single U.S. aircraft dropped the second of two atomic bombs against the Japanese homeland. Those bombs, dropped from lone B-29s, brought to a close the most horrific war ever inflicted on

mankind and negated the need for an invasion of the Japanese homeland that would have resulted in casualties predicted to approach the one million mark. In between these events we saw the aircraft carrier replace the battleship as the center piece of any great power fleet.

Just as the use of air power ended World War II, it ushered in a new era and a new kind of international conflict which became known to the world as the Cold War. From 1948 to 1989 two different ideologies, Communism and Democracy, struggled for the hearts and minds of the people of the world. It was a conflict dominated by air power in the form of a nuclear deterrent force comprised of inter-continental bombers, land- and sea-based missiles, and eventually, space-based reconnaissance intelligence and communication systems. Throughout the Cold War, large standing armies and navies were still necessary to meet the threat.

The two centers of Communism were the Soviet Union and China. To respond to the challenge from the spread of Communism, the western world decided on a simple strategy called containment. It was a wonderfully simple strategy. A ring of bases was built around what was perceived as the Communist Empire. Any attempt to spread communism would be resisted—by force if necessary. It was this policy that brought United Nations troops to Korea in 1950 to fight a three-year war, that gave us the current structure on the peninsula, a Democratic south and Communist north.

Globally there is no longer an ideological argument about the merits of Communism versus Democracy. Communism has been totally discredited. Yet in East Asia we are living and working with residual nations ascribing to the Communist ideology. This situation provides both a challenge and an opportunity as we move into the 21st century—the Asian century.

Just as the impetus and challenge of World War II brought air power to the forefront of military operations, a series of events in the last decade of the 20th century has come together to once again change not only the nature of warfare but also the nature of economic intercourse between nations of the world. This movement is sometimes called a Revolution in Military Affairs (RMA). It encompasses the following: an explosion of computer power, with capacity doubling

every eighteen months and becoming ever cheaper, giving the world unheard of processing capability for a variety of applications. At the same time the miniaturization of digital electronics combined with other revolutions in information technology when integrated with traditional characteristics of air and space power; speed, range, flexibility, and presence will once again fundamentally change the nature of warfare in the opening decades of the 21st century. The ability to find, fix, track, target, and engage with precision anything of consequence anywhere on the globe in near real time will change the nature of warfare. As we have seen in the nineties, air power has already become the first to fight among the arsenal of land, sea, and air forces. It will come to dominate warfare in the 21st century as the phalanxes and legions did in the Ancient World, as naval power did during the Age of Discovery and the dawning of the Industrial Revolution. Land and sea forces will still be important, but their structures will have to be dramatically altered to remain relevant and effective. Nowhere is this any more important than in Northeast Asia.

LOCATION—AND THE FUTURE IN ASIA

In the United States a distinguished group of scholars, politicians, and military experts have been commissioned by the Secretary of Defense and Congress to determine the security needs of the nation in the opening decades of the new century. The National Security Study Group, also known as the Hart-Rudman Commission, is charged with thinking comprehensively and creatively about how the United States should provide for its national security in the first quarter of the 21st century. The group has prepared five working papers to serve as background material for the senior advisors and panel staff members led by retired Air Force General Chuck Boyd. One of these papers, entitled "East Asia," looks at the Korean peninsula and examines future relations between the United States, Korea, China, Japan, and other countries of the region. The paper presents alternative futures derived from current trends and possible events.

Some observations from this paper include the following:

East Asia contains not only upwards of a third of the world's population, but also hosts what is widely taken to be the most likely

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major future competitor for the United States, China, one of its most critical allies Japan, and one of its most intractable problems, Korea. East Asia's importance to the United States is likely to grow between now and 2025, whether due to this region's strengths or its problems.

Among the assumptions used in the paper are:

No major interstate war has occurred within the region through 2025.

Populations in the region age. Since 1995, the number of 15–64 year olds per person 65 years and older has changed as follows: China from 11 to 6, Japan from 5 to 2, Indonesia from 14 to 8, South Korea from 12 to 4, North Korea from 14 to 6. . . . The limitations of extant social security systems to deal with significant aging trends are significant. . . . Japan has had to raise its pension tax substantially to stay solvent, thus depressing capital investment and economic dynamism generally.

There is far wider access to regional and global communication grids and news media throughout the region. As a result expectations have risen steadily. . . . Citizens aspire to better public services, including those having to do with education, environmental quality, crime control, medical care, job training, and others.

More than half of the region's population lives in cities, up from thirty-five percent in 1999, placing great strains on basic societal functions and enormous pressures on governments to improve public services and infrastructures.

China is the focus of greatest security concern for the status of the region. . . . It has focused far more on economic development than military modernization.

Japan has a modernized self-defense force and can act on its own in potential conflict scenarios. But it has not acquired nuclear weapons. Forward stationing of U.S. forces continues under a U.S.–Japanese bilateral agreement, but at critically reduced levels.

A unified Korea has a more modern conventional force, maintains a bilateral security agreement with the United States, and participates regularly in joint security exercises with the United States for humanitarian, search and rescue, peacekeeping, and defensive purposes.

No nuclear weapons, long-range missiles, or U.S. troops are present on the peninsula.

The paper also examines alternative scenarios that for Korea evolve in one of two other ways:

Korean unification has occurred, but through war or a collapse of North Korea rather than through peaceful and deliberate agreement. The result is political instability, economic distress, and social turmoil of unprecedented proportion. The country retains the weapons of mass destruction capabilities of the North. Some U.S. forces remain in the South to help stabilize the domestic situation, but their future is uncertain.

Korea remains divided, although economic interaction has increased, gradually, but significantly over recent decades; North Korea has nuclear weapons. U.S. forces remain in South Korea.

NOTE: The entire paper is available on the Internet at: www.nssg.gov.

“East Asia” is a very well-written think piece. In virtually all of its alternatives the potential of air and space power as a unifying and stable force is very evident. Nowhere is this more evident than in Korea. In divergent scenarios of either peaceful normalization/unification or North Korean collapse from nonmilitary forces, air and space power will be critical to a successful transition.

LOCATION—AIR AND SPACE POWER IN THE NORMALIZATION/UNIFICATION PROCESS

The past fifty-six years have seen two vastly different societies develop on the Korean peninsula. In the South, a modern, highly developed world class nation has built its reputation on the industrious

nature of its people and their desire to be part of the international community. A key to the success of South Korea has been the South's investment in modern transportation and telecommunications systems. In the North, the absence of a modern transportation infrastructure, particularly roads and ports, will greatly complicate any unification/normalization process. This situation will put a premium on airlift for the movement of goods and people.

For military reasons, North Korea has made a significant investment in airfields throughout the country. These airfields will serve as the primary means of opening up the country and providing materials while ports, roads, and railways can be modernized and built. The near total lack of a communications network to support domestic activities and access to global markets and media will present a unique opportunity to make a fairly rapid transition to a space-based communications assets while the more traditional fiber optics and wire systems are installed and upgraded.

In any effort as large as the reunification of the Koreas one of the major resource limitations will be trained and readily available manpower. A source of manpower to assist in unification might well be found in a restructured military force where the combined total of 1.9 million men and women of the North and South Korean armies would certainly not be required. If the full potential of air and space power were used as the centerpiece of a post-normalization/unification military structure, in excess of one million persons should be able to be demobilized. The remaining joint force would be a more balanced and rational force given the domestic situation and likely relationships with neighboring countries.

Finally, as unification and stability return to the Korean peninsula the full potential of its geostrategic location can be realized. With one-third of the world's population in East Asia, the central location of Korea as a major air and commercial center should be readily apparent to investors and commercial interests. Using a thousand-mile radius—(approximately 2 hours by air)—the capitals of the major East Asian nations, as well as the major Asian city of Russia, fall within this circle.

If Korea is to reap the full potential benefits of air and space power to facilitate normalization/unification of the peninsula, planning and

investment must begin now. Contingency planning for access to airfields in the North should already be under way. Modernization plans for both military and commercial sectors should reflect priorities based on the new realities of the changed nature of warfare and commercial intercourse—not traditional investments in outmoded forces and equipment. Airspace and airfield allocation and utilization plans must be revised to facilitate commercial initiatives designed to exploit the geostrategic location of Korea. The design and planning for a complete communication system to facilitate the transition to normalization/reunification should already be done.

As the papers that follow in this conference will show, this will not be easy. While we think about tomorrow, we must live in the present. The near-term challenges of threat assessment, force modernization, theatre missile defense, and overall defense planning in an improving but still weakened economic situation may appear to be a daunting task, but symposia such as this represent a very real first step.

I want to commend the organizers and supporters of this second International Conference on Korean Air Power for their foresight, vision, and contributions to peace and stability in East Asia.

**POTENTIAL THREATS AND POLICY RESPONSES OF
THE MAJOR POWERS**

Jung-Hoon Lee

INTRODUCTION

When given the choice between a tense military situation and peaceful economic prosperity, many will invariably opt for the latter. The problem is, most nations perceive that some degree of military security is essential for their political and economic well being. Therefore, there will always be attempts made by governments to raise the military stakes as a necessary evil to protect national interests, be they economic, political, territorial or religious. For many nations, the more important those national interests become, the greater their need for firmer defense measures. In regions fraught with historic enmity and distrust, as may be the case in Northeast Asia, such a tendency may be even more pronounced. The question posed against this background is What is the cost of raising the military stakes for national or regional military security?

The United States, for example, regards theater missile defense (TMD) in Northeast Asia as a necessary means to deter ballistic missile threats to U.S. forces in the area. The cost of this particular U.S. strategic design is China's anger and the precipitation of, as the Chinese see it, an unnecessary arms race. Now, what then is the cost of not implementing TMD? The proponents of TMD would argue that the cost is the continued vulnerability of U.S. allies in the region,

especially Tokyo, as well as U.S. forces in Japan and South Korea. But, raising the military stakes to enhance security may very well prove to be counterproductive, especially as the stakes may be escalated incrementally. On the other hand, for a nation to lower its guard against possible threats, without fundamental trust or an established security mechanism, is a difficult proposition, be that nation the United States, China, Japan or one of the two Koreas. Finding the right mix of deterrence and cooperation is therefore a major security task that lies ahead in Northeast Asia. Until then, it may not be easy to see a significant reduction in the military stakes being raised in spite of the obvious costs, both financial and security.

Post-Cold War Northeast Asia is still filled with many question marks: What will be the shape of the new regional order? Who will play what roles in the realignment process? Are the dynamics of the bilateral relationships as they exist today fluid or stable? Are there new threats emerging in the region unforeseen during the Cold War period? Does the U.S. military presence serve as a safety valve dampening the impact of a sudden unleashing of regional emotions and projections of power, or is it the main source of tension in the region? The questions are endless, but as yet, very few answers are on the table. The main problem is that there exists in the region overlapping threat perceptions and conflicting military postures resulting from a complex set of factors, including historical memories of the hegemonic traits of regional actors.

Since East Asia has never really experienced a genuine growth of modern international relations, an understanding of the finite deterrence structure is crucial in forecasting the future pattern of regional security in a region fraught with numerous potential flashpoints. In the long-run, two key variables of finite deterrence in Northeast Asia may be, on the one hand, the spectre of Japanese militarism and the future of her regional and international role, and on the other, China's enhanced military profile and her emerging hegemonic ambitions. In the more immediate sense, however, there are three developments that require preventive measures if they are not to pose a major threat to the region's stability. They are: 1) the TMD discussion pitting the United States against China; 2) the U.S.-Japan Security Guidelines, again placing the United States and China in opposing camps; and 3) North Korea's nuclear and missile threats and their implications for the region's security balance. This chapter

will focus on these three current developments, arguing the obvious—that they represent the most immediate potential threat to the region's security. A discussion will follow on the significance of the United States' role in Northeast Asia, given Washington's substantial influence on the shaping of the region's political/security landscape. But first, this chapter will turn to a brief discussion on the possible future course of Japan and China, a factor that will, in the long-run, be more important than any other factors in determining the security environment of Northeast Asia.

THE SPECTER OF JAPANESE MILITARISM: MYTH OR REALITY?

The Gulf Crisis of 1990 and the ensuing debate on Japan's participation in international peacekeeping operations brought into sharp focus the perennial question of Japanese militarism. The common fear among Asian nations was that Japan might use the Gulf Crisis as a springboard for further involvement in international security matters, which, in turn, might pave the way for her re-emergence as a military power. Against the background of a gradual erosion of various restraints on Japan's military potential—such as the scrapping of the one percent ceiling on the size of the defense budget; undermining the arms export ban by way of high-technology goods exports; allowing (albeit tacitly) transit visits by U.S. nuclear-armed ships contrary to the stipulations of the three nonnuclear principles; blurring the offensive and defensive arms classification; and widening the general scope of Japan's defense activities by broadening the interpretation of what constitutes a "threat" to Japan's security in the high seas—many Asians regarded Japan's enhanced international role as another major step that would eventually bring Japan closer to full militarism.¹

Alarmists also point to Japan's progressively improving Self-Defense Forces (SDF) capability as well as her large defense budget. Japan's recent purchases of the new *Patriot* surface-to-air missile system, an escort ship with the AEGIS system, F-15J fighters, E-767 AWACs,

¹For a fuller discussion on Japan's peace cooperation debate and Asian reaction to it, see Jung-Hoon Lee, "Japan's Search for a Regional Role," *The Oxford International Review*, Vol. II, No. 3 (Summer Issue, 1991), pp. 40–43.

type-90 battle tanks, the Harrier-class fighters (AV8B), etc., on top of the continuing development of the next-generation FSX fighter are reasons for neighborly concerns.² As a note, the new National Defense Program Outline announced in November 1995 called for upgrading the SDF's overall defense capability, which coincided with the establishment of the new Defense Intelligence Headquarters in January 1997. But of even more concern is Japan's large defense budget. In the US\$40–50 billion range for over a decade, Japan's budget has consistently far exceeded that of other Asian countries. Also worrisome to some observers is Japan's substantial plutonium stockpile, which is targeted to reach roughly 90 tons by 2010. With both reprocessing and delivery capabilities, a "nuclear" Japan is deemed by many as a matter of simple choice.³

Another factor undermining Japanese pacifism and arousing Asian suspicion is the growing rightist movement in Japan. Japan's increasing sense of self-confidence brought on by her sustained economic growth, especially in the 1980s, seems to have had the effect of, among other things, fostering a revival of nationalism. High-level remarks vindicating Japan's wartime efforts or colonial policies have become conspicuously more frequent. In March of 1995, the mayors of Hiroshima and Nagasaki even went to the extent of likening the 1945 bombings of the two cities by the Americans to Hitler's genocidal killings of the Jews.⁴ The broader implication of this incident is that Japan is trying to portray herself as the victim of the war, not the perpetrator of it. The former Murayama government's inability to adopt, amidst resolute Diet opposition, a resolution that would have made official Japan's anti-war and "apologetic" position is pointed out as yet another example of Japan's growing rightist tendency.⁵ Against this backdrop, the Japanese government's earlier bid to become a permanent member of the United Nations Security Council was received with mixed emotions. While acknowledging the gains of

²Research Institute for Peace and Security, *Asian Security, 1994–95* (London: Brassey's, 1994), pp. 130–33.

³For discussions on Japan's plutonium stockpile, see *International Herald Tribune*, 14 April 1992; "Fuel for Controversy," *Look Japan* (April 1993); and *The Japan Times*, 19 May 1993.

⁴*International Herald Tribune*, 16 March 1995.

⁵*Korea Herald*, 19 March 1995.

placing Japan in an open but tightly monitored international organization, many Asians have opposed such a prospect considering it inappropriate given Japan's continuing reluctance to come to terms with her past.

The fear of renewed Japanese militarism is an old one, but the fact that it is being highlighted more in the post-Cold War period is a testament to the settling in of the finite deterrence structure in East Asia. To put it differently, the growing Japanese assertiveness is a manifest example of an emerging indigenous security-political dynamic as the region edges toward a security complex system. With most Asians still gripped by the indignant memories of Japan's past aggression, Japanese militarism stands out as representing one of the most serious threats to the region's security in the long-run. If Japan is to blossom as a bona fide member of the international community, she must therefore initiate a genuine process of region-wide reconciliation.

CHINA RISING: A RETURN TO THE OLD WORLD ORDER?

Another main feature of finite deterrence in East Asia is what appears to be the "awakening" of the regional colossus, China. The combination of China's rapidly rising defense budget, force modernization effort entailing major arms purchases, and blunt power projection in the South China Sea are raising serious concerns among the smaller and major powers alike as to Beijing's intentions and long-term objectives in the region. The outstanding territorial disputes China has with a host of its neighbors—in the main, Taiwan, Japan, Russia, the Philippines, Malaysia, and Vietnam—certainly adds to the urgency of the situation. To the concerned neighboring states, the argument of "econophoria," that China's continuing economic needs in terms of foreign capital, investment, technology, and markets can subordinate its military/political ambitions, is fast losing credibility.⁶ In the past, what made a Sinocentric world order readily acceptable to the

⁶Gerald Segal presents this school of thought and emphasizes the importance of Japan's role in tying China into a "web of international economic interdependence." Using this as a base, he suggests the possibility of region-wide dialogue for greater "transparency and confidence." See Segal's article, "China's Rising Challenge," in *Japan Times*, 3 April 1993.

"lesser" states was the absence of the modern notion of nationalism and sovereignty. Today, one can hardly expect the same from the still lesser in terms of size and military-economic status, but now fully sovereign, states with distinct national security interests. Sinocentrism in the 21st century is an anachronism that the region would rather not have to deal with.

But, as evidenced in the Spratlys, China seems to be testing the waters by setting up garrison posts and territorial markers in order to see just how much she can intimidate her neighbors into accommodating her will.⁷ China's cavalier treatment of the legal basis of her territorial claims and also of her neighboring states' sensitivity suggests that this giant of a nation is not quite completely over her old habits of doing business in the region. Regional fears about China are of course not helped by the secrecy surrounding her defense budget which ranges from the official 1997 figure of about US\$7.5 billion to as high as US\$50 billion as estimated by the Arms Control and Disarmament Agency.⁸ Whatever the accurate figure may be, China's recent purchases from Russia of twenty Su-27 fighters, four Su-27 bombers, and four Kilo-class patrol submarines indicate Beijing's seriousness in acquiring sufficient military capability to back her bold posture in the region. The focus of China's military buildup has been on its long-distance operational control, particularly centered on its air force and navy. Much attention has also been paid to the development and improvement of its strategic weapons. In particular, China has paid keen attention to the accuracy, range, mobility, firepower, and other capabilities of its missiles. Referred to as a "creeping expansionism" by one Japanese security expert, China's growing assertiveness seems to have gone well beyond the boundaries of self-proclaimed self-defense.⁹

TMD

Turning now to the three more immediate potential threats in Northeast Asia, TMD and its implications will be discussed first. As

⁷Rodney Tasker, "A Line in the Sand," *Far Eastern Economic Review*, 6 April 1995.

⁸Nayan Chanda, "Fear of the Dragon," *Far Eastern Economic Review*, 13 April 1995.

⁹Masashi Nishihara of Japan's National Institute for Defence Studies quoted in *Ibid.*, p. 25.

discussed above, TMD, as specific as its military function may be, carries with it quite substantial political ramifications. This is so because TMD is viewed by Beijing as a blatant anti-Chinese policy by the United States and her friends aimed at encircling China. In China's eyes, the causal link between TMD and North Korean missiles (especially in light of the missile/satellite incident of August 1998) camouflages the real intent of TMD—to threaten Chinese, not North Korean, security. Beijing argues that U.S.-led TMD in Asia is unnecessary because the Chinese missile force—the target of TMD—is “peaceful” in its intents and purposes. The United States, on the other hand, argues that TMD has been necessitated as a result of China's concentrated efforts to improve its offensive missiles system, both qualitatively and quantitatively. From the U.S. perspective, with improvements in China's SRBMs (*DF-15s* and *DF-11s*) and MRBMs (*DF-21s*), TMD, with its defensive characteristics, is more than justified. What the completion of a series of nuclear tests prior to signing the Comprehensive Test Ban Treaty (CTBT) in September 1996 and the development of a whole range of ballistic missiles means is that, China, within the next decade, will possess a modern strategic and theatre nuclear capability. When this happens, China wants to make sure that its capabilities are credible, meaning not rendered ineffective by a successful TMD network between the United States, Japan, South Korea, and Taiwan.

Determining who is more to blame is like asking the question which came first: the chicken or the egg? The obvious problem is that, irrespective of who is to blame, Chinese missiles and American TMD offer a breeding ground for a major arms race, possibly heightening the military tension in the region and beyond. Many analysts believe that China may opt for a rather drastic countermeasure if the United States' TMD-related support for Taiwan arouses tensions across the Taiwan straits. Although TMD—especially in the form of either the Army's Theatre High Altitude Air Defense (THAAD) or the Navy's Theatre Wide (NTW) system—is long-term-oriented strategic planning,¹⁰ the political controversy surrounding the issue has arisen as one of the most destabilizing factors in Northeast Asian security. Yet, with no effective mechanism to control such a development, the

¹⁰Stephen A. Cambone, “The United States and Theater Missile Defense in Northeast Asia,” *Survival*, Vol. 39, No. 3 (London, Autumn 1997), pp. 66–84.

region may have to bear the consequences: the price the region has to pay and will continue to pay for an unmitigated threat perception.

U.S.-JAPAN SECURITY GUIDELINES

From Beijing's point of view, the new U.S.-Japan Security Guidelines, in conjunction with TMD, is a blatant challenge to China's security. Beijing perceives that the United States is putting up roadblocks on China's path to become a legitimate major power in the international community. Amidst such charges, in April 1999 the Lower House of the Japanese Diet passed legislation that would improve Japan's military cooperation with the United States. As specified in the new U.S.-Japan Security Guidelines announced in September 1997, the bills make allowances for Japan to do more to back U.S. military actions in contingency situations in the surrounding areas. In time of belligerency, Japan would be able to send ships to evacuate civilians, supply fuel and spare parts, to allow U.S. forces to use airports and other facilities, and conduct rear-area search-and-rescue operations for U.S. troops. This, however, does not mean that Japan is now free to project its power.¹¹ The "Peace Constitution" is still intact and technically the new guidelines do not allow Japanese forces actually to fight alongside U.S. troops.

The introduction of the Guidelines for U.S.-Japan Defense Cooperation in New York on 23 September 1997 has been received with mixed emotions. On the one hand, the Guidelines are expected to strengthen the existing U.S.-Japan security ties, thereby contributing to a more stable security environment in East Asia. On the other hand, alarmists point to Japan's expanded military role which could eventually lead to Japan's remilitarization, an unsavory development given Japan's past record as an imperialistic power. Whatever the verdict, the Guidelines are generally perceived as a milestone, with the potential to reshape the political-military landscape of the region as a whole. Immediately at issue is the question of how to step up Japan's military role in situations in areas surrounding Japan, including possible contingencies on the Korean peninsula. China, mean-

¹¹Jung-Hoon Lee, "U.S.-Japan Guidelines and the New Security Order in Northeast Asia," *Strategic Studies*, Vol. V, No. 2 (Seoul, Korea Research Institute for Strategy, 1998), pp. 96-112.

while, believes the Guidelines allow for a possible Japanese intervention in a contingency in the Taiwan straits. Officially, the Guidelines are designed to strengthen Japan's rear area support to U.S. forces in operations. This would necessitate Japan conducting such activities as minesweeping, surveillance, and intelligence gathering. Although restricted by the "peace constitution" when it comes to force deployment, the Guidelines seem to clear the way for Japan's military activities on the high seas as well as in international airspace. This, of course, is where the focus of the debate lies.

Against the backdrop of China's emergence as a major power, the North Korean nuclear threat, and more immediately the Okinawan rape incident, the United States and Japan made the decision to commit themselves to build a more specific and balanced system of military cooperation. China, nevertheless, has expressed clearly its belief that the Guidelines are a joint U.S.-Japan effort to expand their hegemonic ambitions while isolating China. The Chinese foreign ministry has officially stated that U.S.-Japan interference in the Taiwan straits amounts to a violation of Chinese sovereignty.

South Korea, on the other hand, has argued that given that the specific guidelines are within the rigid framework of the U.S.-Japan Security Treaty, there is more to gain than to fear. The South Korean government is therefore encouraged, through diverse channels of dialogue, to make every effort to join the U.S.-Japan cooperative scheme, rather than shy away from it.

DEALING WITH NORTH KOREA

North Korea's recent nuclear brinkmanship brought to the fore the spectre of region-wide nuclear proliferation, adding a new dimension to the meaning of regional security—or rather, insecurity. Having raised the level of tensions in the Korean peninsula to new heights, the impasse over North Korea's nuclear weapons development program was broken by the landmark agreement signed between the United States and North Korea on 21 October 1994. This agreement temporarily set aside the possibility of a military showdown, but the whole turn of events clearly signified the emergence of North Korea as a key component of the region's finite deterrence.

Historically, Korea never posed a threat to anyone. If anything, Korea only figured in the region's power politics either as China's buffer against Japan or as Japan's continental springboard. As such, the notion of this traditionally docile, if not weak, peninsular state now posing a major threat of its own—although limited to the northern half—is not a historically embedded feature of the regional dynamics. But be that as it may, North Korea has successfully maneuvered its nuclear card to enhance its position in dealing with the major regional powers, especially the United States. Just consider North Korea's gains in exchange for its nuclear cooperation. For agreeing to freeze and eventually dismantle its suspected bomb-making capability, North Korea gets two light-water reactors worth US\$4 billion, 500,000 tons of heavy oil supply every year until the promised reactors are completed, a deferment of up to five years of special inspections of two undeclared waste sites (the original source of contention), and also a delay in the shipment of the 8,000 spent fuel rods.¹²

Although not realized yet, possible political gains for North Korea are even more significant. For one thing, the prospect of diplomatic recognition from the United States and Japan would not only boost North Korea's international standing, but also contribute toward Pyongyang's long-held political goal of detaching South Korea from her two closest allies. As a byproduct, subsequent economic assistance from these two countries, on top of large sums already being provided by South Korea by way of the Hyundai Group, can also reverse the trend of negative economic growth experienced since 1990. But perhaps most important of all is the possibility of linking the nuclear accord with the larger issue of replacing the armistice agreement of 1953 with a peace treaty. If agreed to, this will inevitably lead to the gradual withdrawal of American troops from South Korea, leaving Korean affairs to be handled by the Koreans themselves. Given Pyongyang's long-held "liberation" objectives, the withdrawal of U.S. troops is an unsettling proposition that could lead to greater volatility rather than a peaceful reunification.

¹²For the full text of the U.S.–North Korea agreement, see "The U.S.–DPRK Nuclear Agreement," *Diplomacy*, Vol. XX, No. 10 (25 October 1994), pp. 18–19.

North Korea is a destabilizing source in East Asia not only because of its nuclear threat, but also because it can serve as a competing ground for the regional powers harboring hegemonic ambitions, that is through the medium of Korea. For instance, in view of the inevitability of the U.S.–China rivalry to become the new regional balancer of power, it may be in the United States' best interest at least to neutralize the North Korean factor. If Japan were to jump into the picture and try to move ahead of everyone by precipitating the normalization process with North Korea to facilitate the entry of its monopoly capital into this untapped market, this would have a similarly destabilizing effect throughout the region. As unlikely as these scenarios may be, they attest to North Korea's important position in the calculation of the region's security. Besides, as mentioned in the previous section, wars fought for supremacy over Korea were not uncommon in the not-so-distant past.

One might say that North Korea has raised the military stakes on the Korean peninsula to enhance its security through its nuclear weapons and missiles development programs. On the other side of the spectrum, South Korea has done just the opposite—that is, it has tried to reduce the military stakes—in order to woo North Korea to agree to improved inter-Korean relations. The current South Korean government, through the medium of its “sunshine policy,” has embarked on an open-ended policy of engagement by voluntarily granting a healthy dose of compromise and reconciliation. Some conservatives argue that South Korea may in fact not be raising enough military stakes to complement the compromises being made. To these critics, diplomacy is not only about promoting goodwill. In order for diplomatic efforts to be successful, it is argued, there invariably has to be a balanced mix of goodwill efforts and credible threats. The more intense the conflict/tension in need of resolution, the greater the need for such a mix. The big question about the sunshine policy is: “where is reciprocity?” It should be added that the ongoing four-party talks together with the KEDO negotiations have done little to redress the problem at hand. One of the reasons for Perry's recent Pyongyang visit was to grope for ways to break the impasse that has frustrated many, especially on Capitol Hill.

There is, of course, no danger in engaging the North. In fact, engaging the North is quite welcome. The problem is, it is not quite as

“risk-free” as the advocates of the sunshine policy claim. As pointed out by James Baker in assessing Clinton’s engagement policy toward North Korea, “appeasement,” as it was referred to, falls into the trap of rewarding without merit, while encouraging bolder and more aggressive demands and behavior from the North.

Does the sunshine policy then ensure an acceptable outcome in the end? This remains to be seen as the policy is conceived of as a long-term process. While waiting for results, however, some adjustments can be made to deal with its criticism. First, every effort has to be made to revive the December 1991 Basic Agreement reached between the two Koreas. This means fundamental issues such as CSBMs, telephone line exchanges, a liaison office, divided family reunion, etc., should be dealt with in the larger context of the basic agreement instead of through the medium of the Four Party talks. This would be necessary to return the diplomatic initiative back to South Korea, the most direct party involved in the peninsular talks. Second, a new forum for discussion beyond the Four Party talks may be appropriate to include Russia and Japan as formal members of dialogue. Here, Russia’s earlier efforts to compel North Korea to join the NPT in 1985 and Japan’s economic leverage in normalizing relations with North Korea should be taken into account. Third, South Korea must thus muster multilateral pressure on North Korea to respond positively to the sunshine policy. It should be remembered that North Korea is quite capable of making compromises when push comes to shove. As shown in December 1991, North Korea, when concerted external pressures are applied, will opt for reconciliation instead of turning hostile as many suspect.

CONCLUSION

The revival of Japanese militarism, China’s ascension as a malignant regional hegemon, together with the debates over TMD and the U.S.–Japan security guidelines as well as North Korea’s nuclear and missiles brinkmanship all show the precarious nature of the next East Asian regional security system. As it happens, the U.S. presence in the region has thus far prevented an escalation of multi-layered and latent military tensions among regional actors. From this perspective, the United States has played the role of a credible regional stabilizer preventing, along the way, Japanese militarization, China’s

hegemonic ambitions, and of course North Korea's military adventurism. There is also the negative view, as purported in the main by China, that regards the United States as the main source of threat and tension in the Northeast Asian region. Here, TMD and the Guidelines are raised as cases in point.

Whether raising the military stakes is necessary or not really depends on the circumstances under which they are being raised. It suffices to say that they usually incur large costs. In the Northeast Asian region, where conflicting national interests arising out of historic suspicions are more common than not, the tendency to raise the military stakes is likely to continue regardless of the costs. In the absence of a functional regional security architecture, the region may have to cope more with the question of how best to dampen the effects of military threats when raised, instead of eliminating the stakes given the complex dynamics of each country's security perception and outlook.

**DEFENSE PLANNING IN AN ERA OF UNCERTAINTY:
EAST ASIAN ISSUES**

Paul K. Davis

INTRODUCTION

Defense planning is largely about developing capabilities and options for the mid and long term. A fundamental element of such planning is accounting for uncertainty. This essay reviews basic concepts for planning under uncertainty and relates them to U.S. national security strategy. It then addresses East Asian issues, including potential changes in the East Asian strategic environment and the implications of the revolution in military affairs (RMA)—for both the United States and regional allies, notably the Republic of Korea (ROK).

BASIC PLANNING CONCEPTS

The Baseline Paradigm for Much Defense Planning

As background, consider a common but naïve planning paradigm that can be found in organizations worldwide and in defense-planning organizations specifically (Figure 2.1). The concept is that one begins (top left) by assessing the threat and characterizing the related requirements for defense. Then one develops options for dealing with the threats, evaluates the options to find the “optimum” strategy, and proceeds to implement that strategy. This is what might be regarded as a mathematician’s preferred approach. It is compara-

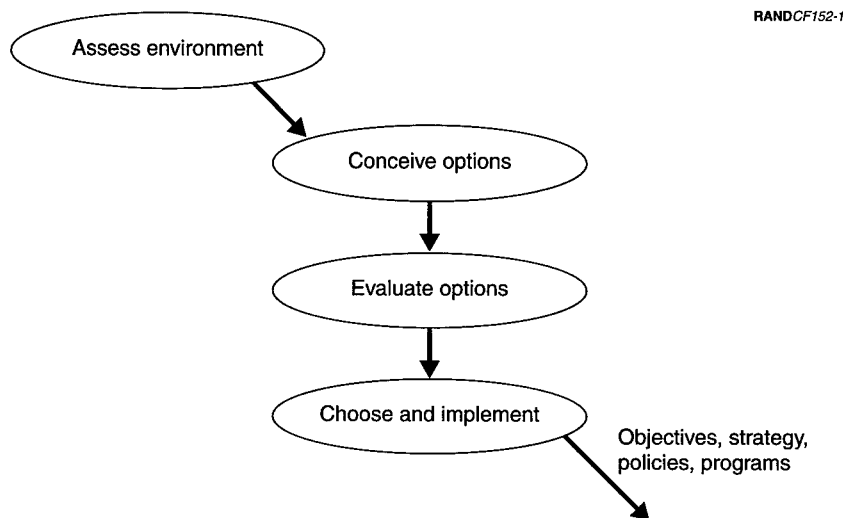


Figure 2.1—Naïve Planning Model

ble to the engineering problem of being given “requirements” for some system and then developing a system to meet those requirements.

Although seemingly straightforward, this planning model is insidiously inappropriate for anyone charged with *strategic* planning. First, it narrows thinking by focusing unduly on specific threats rather than recognizing the full range of challenges that military forces serve. Second, by treating threat and requirements as something accomplished first and then handed over to analysts, it encourages planners to imagine that someone (the intelligence community?) can accurately characterize “the” future threat and related requirements. Even worse, the usual tendency is to deal crudely with uncertainties. To some extent, such planning was perhaps defensible in past decades, but it is rather obviously a misfit with today’s needs, not only for the United States, but also for South Korea. Although for the time being North Korea is an immediate, ominous, and somewhat understood threat, South Korea’s planning for the longer term requires a different focus (Republic of Korea, 1998; Moon and Lee, 1999).

A Better Planning Model

A much better general model is suggested in Figure 2.2.¹ This model starts by recognizing that, although many aspects of the future security environment are reasonably predictable, *uncertainties are large and pervasive*. Thus, instead of focusing on “forecasting,” which tends to be little more than extrapolation, we should proceed on multiple tracks. Yes, we should do the extrapolation, characterizing the “no-surprises” future. And, yes, we should sketch the basic, “core,” elements of strategy applicable to that no-surprises future (bottom left of Figure 2.2). But there is much more to be done.

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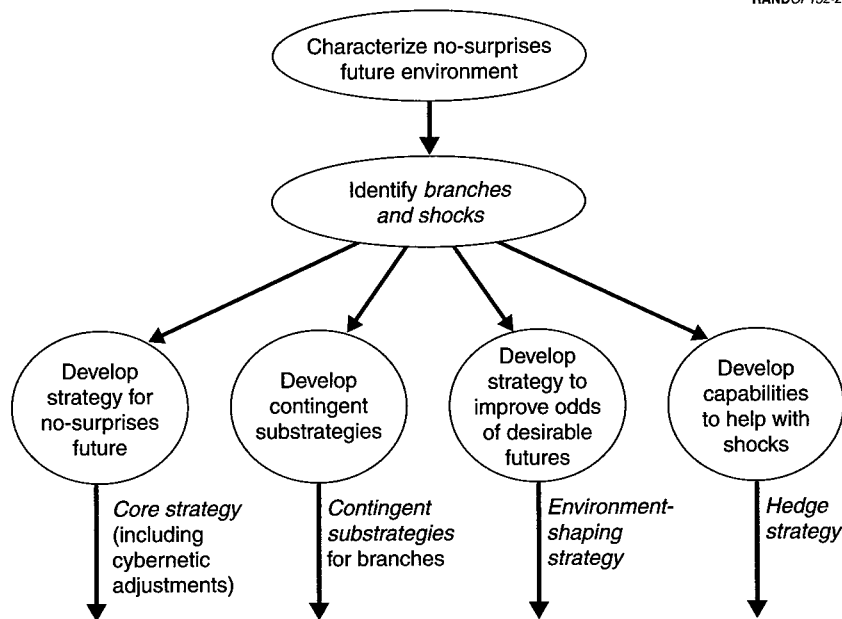


Figure 2.2—An Improved Strategic Planning Model

¹See Davis (1994, Ch. 4). The methodology stems from work done by the author and Paul Bracken in the late 1980s. For a short survey of strategic planning methods, see Davis and Khalilzad (1997).

In addition to dealing with the no-surprises case, we should explicitly identify “branches” and “shocks.” Branches can be thought of as “scheduled uncertainties”—uncertainties that one knows about and that will arise and resolve themselves more or less at a predictable time. For example, what will happen to North Korea is an uncertainty with this character. We are well aware of the uncertainty and about possible scenarios for North Korea’s unraveling or stabilizing, and for eventual Korean reunification. In this case, we can behave as though the uncertainty will resolve itself within, say, the next ten years. And, as indicated in the second item along the bottom of Figure 2.2, we can develop relatively detailed contingent substrategies to deal with the more likely scenarios (including war). Whether we actually accomplish this contingency planning is another matter, but doing so is at least possible and desirable.²

Continuing rightward along the bottom in Figure 2.2, we see reference to the concept of an *environment-shaping strategy*. This component of strategy is extremely important because, ultimately, the principal role of military forces in peacetime is to work together with other aspects of security strategy to greatly reduce the likelihood of future wars. By far the best way to “manage crises” is to avoid having the crises in the first place. And, in favorable circumstances, nations’ engagement can encourage development of enough shared values and interests—including respect for international norms—to help significantly in this respect. Environment shaping, then, is not about hegemonic coercion, but rather about engaging other nations in mutually respectful and productive ways. For the United States and like-minded nations, this includes promoting liberal democratic principles, but it also means trade, military cooperation, and bilateral and multilateral political efforts.

The last item in Figure 2.2 is developing a *hedge strategy* to help deal with shocks. In some respects, shocks are the most interesting uncertainties. Human beings often are in what psychologists call a state of denial about how truly uncertain the future really is. One symptom of this is the chronic tendency—even of sophisticated policymakers and academics—to give short shrift to what are believed to be un-

²See Han (1999) for discussion of why such contingency planning is needed with respect to how North Korea collapses, withers away, or integrates peacefully with South Korea.

likely events—not only to ascribe to them low probability, which may be reasonable, but essentially to ignore them, which is not. Even worse, it is common to denigrate those individuals who believe that such events are more likely than conventional wisdom would have it.

As Figure 2.3 reminds us, however, if we have a set of individually unlikely events, the probability of at least one of them actually occurring is sizable. Further, if we have underestimated the probability (e.g., assessing an event with 30 percent probability as having only a 10 percent probability)—something we are apt to do because of deeply rooted cognitive biases—then we will quite probably be surprised by what happens. Even with only three such events to worry about, the probability of at least one occurring would be about 65 percent.

Figure 2.4 lists some of the many historical shocks of the last few decades. These should reinforce the reality of shocks and encourage humility. *None* of these momentous events was expected—nor even taken seriously as a possibility by governments. Fortunately, shocks can be positive as well as negative, as illustrated by President Sadat's

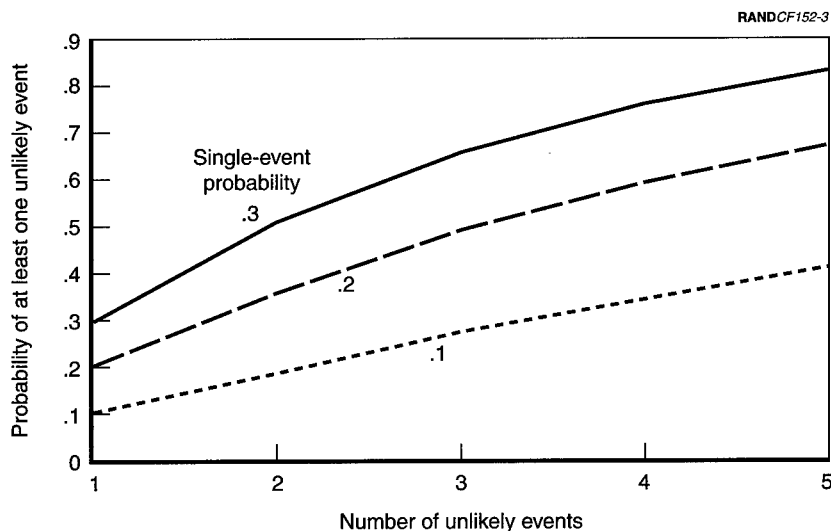


Figure 2.3—Why Hedging Against Unlikely Events Is Important

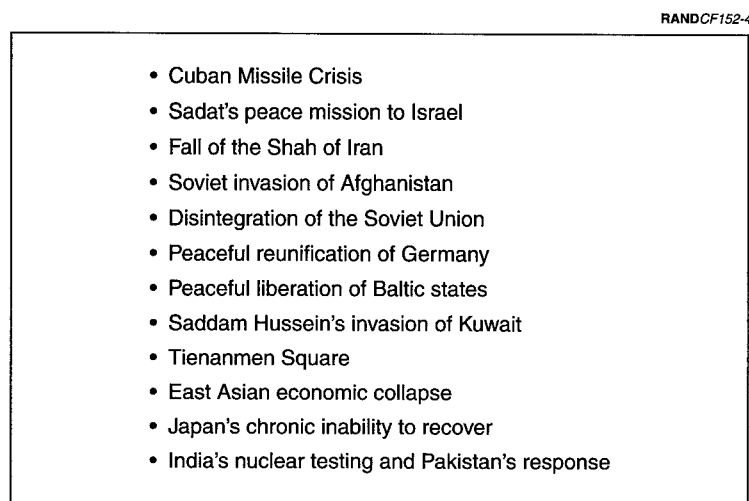


Figure 2.4—Historical Shocks That Encourage Humility

peace mission to Israel and the peaceful unification of Germany that occurred after the Soviet Union collapsed.

The admonition, then, is to pay attention to allegedly low-probability events and to develop hedge strategies for dealing with them. These cannot be developed in detail or funded lavishly, but laying groundwork for dealing with them if they arise can pay high dividends. Preparations should include thinking about potential *opportunities*, not just potential disasters. Finally, note that by hedging against negative shocks a nation often is able to reduce their likelihood. The objectives of general deterrence and foreign relations are served when potential aggressors know that their potential targets have the capacity to build defenses rapidly.

The Central Role of Adaptiveness

A corollary to the emphasis on the significance of shocks is that expectations should be lowered regarding the value of detailed planning: in fact, the likelihood of detailed plans proving valid over the long run is low. Nor can we *rely* upon environment-shaping efforts to

be successful: too much about the international security system is chaotic.³ Success in the long run will therefore be associated with the ability to adapt as necessary to what actually transpires. That is, what matters is *adaptiveness* and this applies very much to defense planning (Davis, Gompert, and Kugler, 1996).

It is useful to distinguish sharply between two kinds of adaptiveness:

1. *Operational adaptiveness* is having flexibility and robustness of forces at a given time:
 - Flexibility to be used in different ways and different pol-mil scenarios
 - Robustness to assumptions about scenario details (e.g., warning time)
2. *Strategic adaptiveness* is the ability to change military posture quickly and easily over time in response to shifts of geo-strategic environment or national strategy:
 - Quickly enough to meet challenges
 - Easily in terms of budget and assured effectiveness

The basic concept here is that a nation should want its military forces to be operationally adaptive so that, at any given time, it can deal with a wide range of contingencies and situational details. It should also want a posture that can be shifted gracefully as the strategic environment or national strategy changes. Here “quickly” might mean within a few years, and “easily” might mean with relatively small effects on overall defense budget (1–10 percent, not 25–50 percent).

If a nation takes seriously planning for adaptiveness—rather than for some particular notions about specific environments, threats, and situations—then the effect is profound. The very nature of planning

³The term “chaotic” is apt here, since the international security system is what scientists call a complex adaptive system, one attribute of which is that developments can be exceedingly sensitive to a variety of very small events. Historians who write as though the events they describe had been inevitable are often doing a great disservice to their readers. See Alberts and Czerwinski (1997) for related discussion, including the paper by James Rosenau.

changes from a tedious process of extrapolation and justification of the status quo to a more creative assessment of potential needs, an uncertainty-sensitive assessment of the relative merits of program alternatives, and a change in language. “Best estimate cases” become something to be viewed with suspicion, and capabilities that would be useful in a wide range of situations and scenarios become attractive. Acquisition of systems also changes. Instead of attempting always to maximize the buy of some system to bring down its unit cost, or of buying systems or forces that would marginally improve a nation’s current defense capabilities against current enemies with current doctrine, it may be willing to pay a premium for the benefits of small-scale experiments with advanced systems and doctrine, experiments that would assure the ability to procure or buy the needed systems and use them effectively if needed. This, of course, runs counter to the preferences of bean counters, accountants, and budgeters—and sometimes current generals. But it makes for good strategy.

The Defense Program as a Portfolio of Investments

One more “big concept” is particularly useful: the idea of viewing the defense program as a *portfolio* of investments as shown in Figure 2.5 (Davis, Gompert, and Kugler, 1996). Although developed for the purposes of U.S. planning, the same structure can be applied to other nations and to alliances. The basic picture is that defense planners should think of themselves as investing in several classes of activity. Balancing those investments (i.e., balancing the portfolio) requires a mixture of analysis and judgment; decisions on how to do so should be revisited regularly. This approach stresses operational adaptiveness (first branch), strategic adaptiveness (third branch), and environment shaping (second branch) rather than the myth of one-time decisions, much less one-time optimal decisions.

A version of this construct has been adopted by the U.S. Department of Defense. Indeed, the strategy of Respond, Shape, and Prepare Now, as indicated at the bottom of Figure 2.5, is now at the heart of U.S. national security strategy, not just defense strategy. The ideas were first articulated by DoD in the 1997 Quadrennial Defense Review (QDR) (Cohen, 1997), but have subsequently been developed

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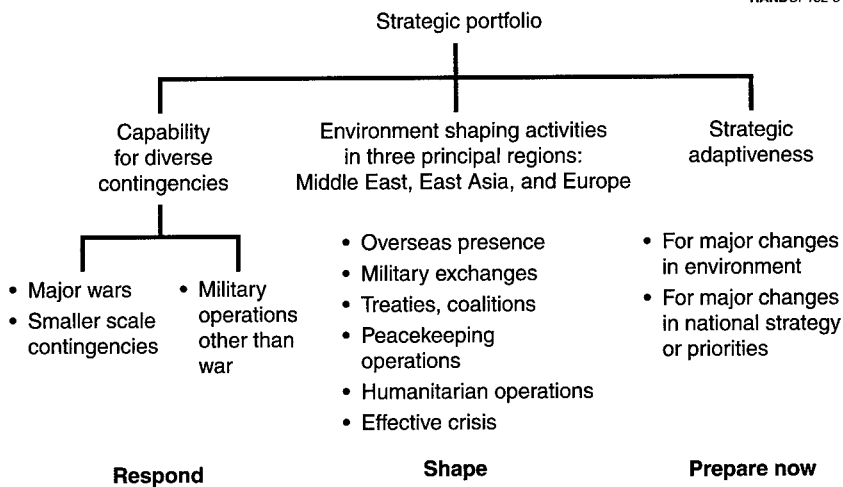


Figure 2.5—A Portfolio Construct for U.S. Strategy and Planning

in defense reports, the defense planning guidance, and responses to strategy by organizations such as the National Defense Panel (1997).

Nor is the strategy one of merely relabeling old concepts.⁴ DoD's strategy departs sharply from cold-war paradigms and has been marked by new attitudes about what should determine overall force structure and posture. Naval forces, for example, now have an explicit top-level role by virtue of the shaping mission and their special capabilities early in conflict. They are seen as even more valuable than before. Another change is recognition that the number of major Army and Air Force formations needed in the active force is justified by shaping activities and the lesser contingencies and conflicts of recent years. It is *not* necessary to worry about two sudden major the-

⁴Many of the ideas had long been present implicitly in U.S. planning, and some had been explicit in the statements of policy by Secretaries Cheney, Aspin, and Perry. However, actually using these ideas as an organizing principle for managing the department is new and significant. It has changed the structure of discussions and is changing the measures by which programs are evaluated. The lead for this work has been the Assistant Secretary of Defense for Strategy and Threat Reduction, Dr. Edward Warner, and his senior staff.

ater wars to conclude that the United States needs its current structure—although, significantly, the number of people and platforms in major formations will and should drop over time as the United States substitutes technology for labor (Davis and Kugler, 1998).

The Respond Component and Capabilities-Based Planning

The Respond component of strategy (left side of Figure 2.5) is closely related to *capabilities-based planning*, an approach that avoids dwelling on any specific threat, but rather seeks to assure the existence of military capabilities adequate to deal effectively with a wide range of contingencies (including wars), and to do so in diverse operational circumstances (Davis, 1994; Ch. 4). This approach is sensitive to issues such as Achilles' heel problems (e.g., dependence on warning and vulnerability to mass-destruction weapons) and so-called "asymmetric strategies" of opponents. Indeed, one conclusion from extensive RAND capabilities-based analysis is that U.S. success in mid-term major theater wars would likely depend more on presence and rapid deployment of "high-tech" capabilities than on numbers of divisions, wings, and battle groups (Davis, Hillestad, and Crawford, 1998; Bennett, Twomey, and Treverton, 1999). This also has important implications for resource allocation, especially when using resource-allocation methods developed for portfolio-style analysis (Hillestad and Davis, 1998).

Environment Shaping

The shaping component of U.S. strategy is discussed in a variety of sources (e.g., Institute for National Strategic Studies, 1998) and will not be elaborated upon here, despite its importance and its emphasis by the author for more than a decade. Instead, let us turn to strategic adaptiveness—what DoD calls "Prepare Now."

A DEEPER LOOK AT STRATEGIC ADAPTIVENESS

Determinants

So far, the DoD has interpreted "Prepare Now" primarily in terms of "transforming U.S. forces" for the challenges of future warfare—even though the United States currently has no "peer competitor," not

even a regional peer. Doing so would, in the DoD's terminology, exploit the opportunities of the Revolution in Military Affairs (RMA). Let us defer discussion of transformation and the RMA until later in the paper, however, and turn instead to a broader view of strategic adaptiveness. Some of the broader issues are particularly relevant to Asia.

Recalling that strategic adaptiveness is the ability, quickly and at reasonable expense, to adjust to changes in environment over time, Figure 2.6 suggests that many factors contribute—including, perhaps most importantly, a nation's industrial base and economic health.

Figure 2.7 suggests that strategic adaptiveness has four major components, corresponding to the ability to adapt to new assessments regarding: (1) the international security environment; (2) military technology; (3) the realities of cost, performance, and organizational behavior; and (4) national priorities as reflected notably in the defense budget and policies regarding degree of engagement (e.g., military operations other than war).

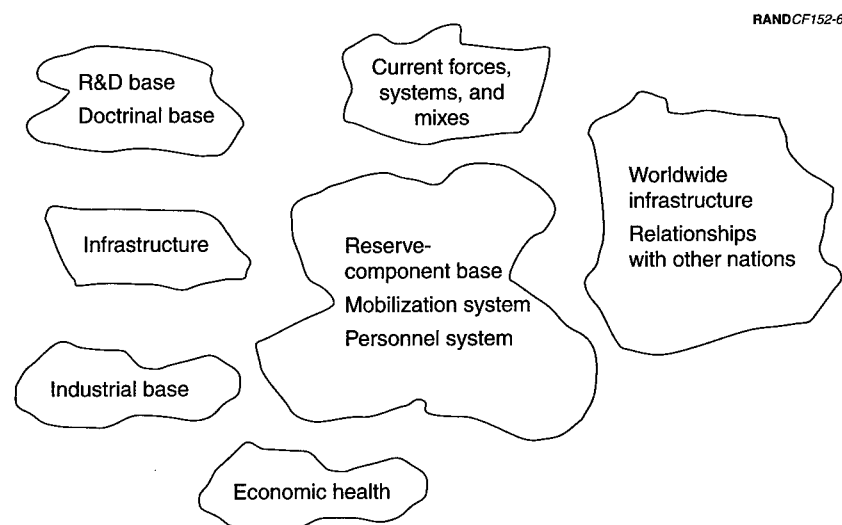


Figure 2.6—Determinants of Strategic Adaptiveness

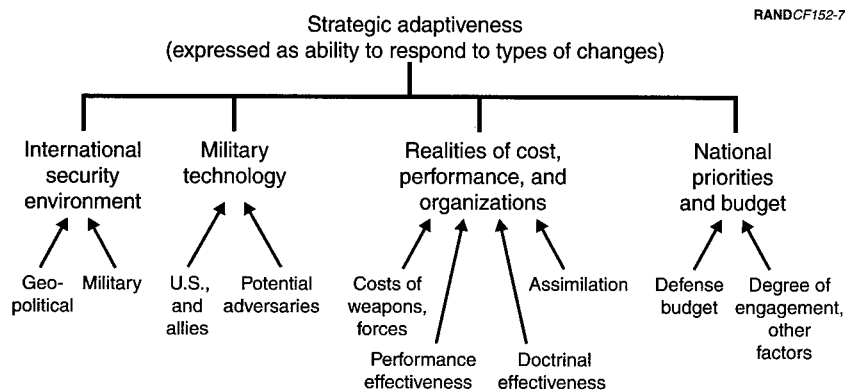


Figure 2.7—Components of Strategic Adaptiveness

A few subtleties are worth further elaboration. Military developments are shown here under both the first and second component. If a threat emerges in the form of, say, a large force structure and apparent bad intentions, that would be part of a changing environment. So also would this component include the challenge of increasingly plausible manpower-intensive conflicts. If the nature of warfare begins to change as the result of technology (e.g., adversaries with long-range accurate missiles), however, that is covered in the second component.

The “realities” component covers a number of different challenges. For example, weapons and forces may prove much more (or less) expensive than initially projected; and their performance may prove much worse (or better) than projected. As examples, consider that the cost of precision weapons has dropped substantially in recent years, but the feasibility and cost of ballistic missile defense (BMD) is still a major uncertainty.

Moving to organizational issues, we may find that it is much more difficult than expected to introduce new types of weapons, systems, and forces because of doctrinal difficulties or organizational resistance. Or the changes might be much *less* difficult to accommodate. Examples of resistance that come to mind to an American include the tenacity with which the major nations going into World War II

held onto battleships after they were no longer sensible and the resistance to large-scale purchase of unmanned aerial vehicles (UAVs) by the United States and most of its allies. Organizational resistance can be fierce.

Historical Adaptations as Proof of Significance

The reader might ask whether this is making much ado over very little. Strategic adaptation is a nice concept, but how important is it? Figure 2.8 suggests the answer by showing historical examples of how, in fact, the United States made *major* strategic adaptations over time—most of them quite unanticipated a decade before they began. These included development, in the years before World War II, of carrier battle groups, and forces for armored warfare and amphibious operations. In the 1950s, the most dramatic shift was a misguided tilt toward a strategy of massive retaliation and dependence on tactical nuclear weapons. Also in the 1950s, the United States recognized that the strategic nuclear balance depended sensitively on the *survivability* of its delivery systems such as bombers, not just on their lethality. As a consequence, the United States shifted away from forward basing of strategic bombers. In the 1960s and 1970s, NATO evolved its strategy to one of flexible response and a forward conventional defense. This happened gracefully, from a historian's perspective, although it took the better part of 25 years.

Deferring until last discussion of the Rapid Deployment Force, Figure 2.8 also mentions the development of stealthy aircraft, which rendered obsolete a Soviet investment in air defenses that would probably cost several hundred billion dollars in today's currency, but that has also proved invaluable in regional conflicts of the 1990s. And, of course, in the wake of the Cold War's demise, the United States sharply reduced its force structure, closed bases, and adapted to an utterly new strategic environment in Europe. Finally, Figure 2.8 mentions the ongoing enlargement of NATO—a strategic adaptation with potentially profound long-term consequences.⁵

⁵NATO's enlargement will avoid ambiguous security relationships that could undercut deterrence in some future crisis with Russia, but could also have *negative* shaping effects by providing fodder for ultra nationalists in Russia. If enlargement occurs now and years go by with NATO posing no threat to Russia, however, it will be difficult for

RANDCF152-8

- Before World War II, restructuring for carrier battle groups, armored warfare
- After World War II, assuming mantle of free-world leader; NATO
- Before and during World War II, Korea and Vietnam; and during 1980s rapid buildups after disasters
- In 1950s, shift to massive retaliation
- In late 1950s, early 1960s rebasing of strategic bombers
- In 1960s, shift to flexible response
- In late 1960s–1970s, shift to NATO forward defense
- In 1980s, creation of Rapid Deployment Joint Task Force for SWA
- In 1980s, stealth aircraft to trump massive air defenses
- In 1990s, scaling down of force structure
- Circa 2000: NATO enlargement?

Figure 2.8—Examples of Important U.S. Adaptations Over Time

A Case of Special Relevance to Planning for Adaptiveness. Returning to the item deferred from above, consider that during the period 1979–1981, the United States began a major adaptation that gained relatively little attention at the time, but that had large effects a decade later. It illustrates many points relevant to today's world in which threat-based planning makes no sense.

This adaptation was the development of what was then called the Rapid Deployment Joint Task Force (RDJTF), which later became the U.S. Central Command (US CENTCOM). The adaptation was to the observation by the U.S. National Security Council in 1977 that Persian Gulf oil had become an extremely important security interest, but was located in a region of inherent instability. To paraphrase loosely from a 1979 DoD study led by the author, “In this region, no one can even say with certainty who will be the enemy of whom ten years hence.”⁶ Notably, in retrospect, the report did highlight the

future Russian nationalists to frighten the Russian people into seeing an enemy that does not exist.

⁶This was “the Wolfowitz report,” prepared under the general direction of Paul D. Wolfowitz during the Carter Administration. Wolfowitz later served as Ambassador to Indonesia and Under Secretary of Defense for Policy.

plausibility of Iraq invading Kuwait, but it also considered a broad range of other scenarios such as Soviet invasion of Iran and various smaller-scale contingencies. Most important, the report's sober view was that the United States had virtually no military capability to deal with events that might arise in the Gulf. There was a vacuum—one that had developed since the British had withdrawn from East of Suez.

What made this problem especially challenging was the absence of any one specific, credible threat or threat scenario upon which to focus, no specific enemies, no specific or highly credible threat scenarios, and few defense obligations (something that may seem relevant to strategic thinkers in East Asia today). To skeptics of that era, it seemed that the DoD was inventing threats when it considered possible Persian Gulf contingencies. From a strategic planning perspective, however, what the United States needed to do was develop broad and flexible capabilities as a hedge against a *range* of possible conflicts. Not too *much* capability, since defense budgets are always constrained, multiple claimants for the marginal dollar always exist, and excessive capability could be threatening to other nations—but enough to be significant and enough to create the basis for further expansion if the need arose—i.e., enough to facilitate strategic adaptation if it became necessary.

In fact, it *did* become necessary—primarily because of Soviet military activities on the periphery of Southwest Asia from December 1979 through the mid 1980s. By 1990, when the Gulf War began, the United States had a competent command for the region, arrangements for regional access, regional prepositioning, maritime prepositioning, and much improved strategic mobility. No one in 1998 was expecting war with Iraq, and few were expecting it even in 1990, but the United States had a substantial *capability* for dealing with contingencies. When the time came, it proved its value. To anticipate points taken up later, some of the most important features of that preparation included a decade's activities with regional states—activities that included military cooperation and exercises, port visits, and access arrangements. Had those activities not taken place well before there was an immediate crisis, the outcome might have been much more unpleasant.

Implications. All of this discussion has been to one purpose: to demonstrate that uncertainties are serious and ubiquitous and that—despite the cynicism of those who see politics and organizational factors as precluding rational behavior of governments—good strategic adaptations are real and feasible. In some cases it is easy to imagine the consequences if such adaptations had *not* occurred. The Japanese might have won the Pacific War, the NATO alliance might have disintegrated had it stuck to pure dependence on nuclear deterrence, and Saddam Hussein might now control half the world's oil. To end with a political-level example, we might ponder how different East Asia would look today had the United States not begun engaging China during the Nixon administration.

Potential Strategic Adaptations in the Years Ahead

Against this background, let us now consider some of the strategic adaptations that *might* be necessary in East Asia in the years and decades ahead. To set the stage, consider some of the branch points and shocks that characterize our uncertainty. Figure 2.9 provides one such list. It focuses on negative shocks, although the more general methodology emphasizes that positive shocks are also quite plausible (recall the collapse of the Soviet Union and peaceful reunification of Germany).

What kinds of U.S. adaptations might be plausible, depending on events and on allied preferences? The range of possibilities here is quite large and some of the possibilities are at first nonintuitive. It is interesting to note, for example, that in the wake of the Soviet Union's collapse, many believed (as did the author) that U.S. allies in Europe would find it natural to thank the United States for her many years of assistance, but then request that U.S. forces go home. That would also have seemed natural to the United States, and would have been quite comfortable politically. Upon thinking about the security environment, however, Europeans concluded that they strongly preferred that U.S. forces remain in Europe. To be sure, there was a substantial drawdown, and the character of the residual forces is quite different from the force structure there in, say, 1987, but it currently appears that the U.S. presence in Europe is there, if not permanently, at least for the long-term. What, then, will seem appropriate in Asia if the North Korean problem goes away?

RANDCF152-9

- Geopolitical
 - North Korea disintegrates
 - China expands nuclear arsenal and threatens neighbors
 - U.S. sees perimeter of strategic interests expand in S. Asia
 - Allies ask U.S. forces to leave (Japan, Korea)
 - Japan “goes it alone” militarily
 - After bad experiences, U.S. backs away from engagement
 - Ultra-conservative Russian government emerges
- Technology and realities of cost, performance, and organizations
 - Inexpensive countermeasures to U.S. precision-strike
 - Continued technical or economic failures in BMD
 - Large-scale proliferation of long-range missiles and chemical/biological weapons
 - Vulnerability of air bases and concentrated, localized forces
- Economic
 - Continued serious shortfalls in investment

Figure 2.9—Potential Forcing Functions of Change

Speculation on such matters is fraught with danger, but the following assumptions appear worth pursuing—as more than “mere” hypotheses, but certainly not as confident predictions. They apply to the era *after* the North Korean issue resolves itself *if* that occurs gracefully, without creating new problems. The assumptions essentially describe a possible future. They are:

- The United States continues to have very strong interests in the Asia-Pacific region.
- Most Asian nations (and perhaps even China) wish the United States to continue its role as stabilizer.
- All Asian nations are reluctant about having U.S. military forces in their own nations, insistent on establishing their own command and control systems, and especially leery of U.S. ground-force presence. The principal exception is a Japanese willingness—in the larger context of defense arrangements—to permit

continued U.S. stationing of ground forces in Okinawa. Japan also permits a continuing Air Force presence and, possibly—depending on technological developments—Army units associated with ballistic-missile defense.

- Korea sees herself as a middle power with no immediate threat, despite the massive presence of China on her border. Korea sees the need to develop a substantial, modern defense capability, but no need to prepare overtly and in detail for defense against China.
- Korea wants to develop a substantial “defensive defense” that would pose no threat or provocation, plus modest power projection capability suitable to Korea playing a role in international peacekeeping operations. Korea recognizes the need under this strategy to transform her forces using appropriate versions of “RMA technology.” She wants her modernization efforts to drastically improve the viability of her ground forces in future conflict (more survivable, maneuverable, and lethal), and to assure the ability to procure or build her own even more advanced systems, and use them effectively, if the need arises. By and large, however, she sees herself able to use middle-level technology and the character of her own geography and terrain to assure a substantial self-defense capability. That is, she will settle for a moderate form of deterrence suitable to a middle power with a great-power neighbor.^{7, 8}
- Korea sees great value in a continued security relationship with the United States—with the United States serving as a source of technology and expertise, and as the ultimate more-or-less off-shore balancer. Further, after giving the matter deep thought for some time, she sees great value in having the United States be *able* to assist in a hypothetical future crisis—not only with Air Force and Naval forces, but also with rapidly deployable “RMA”

⁷Some of these aspects of deterrence theory are discussed in Appendix J of National Research Council (1997).

⁸In principle, such a deterrent would include at least some retaliation capability—whether centered in air forces or missiles with greater range than South Korea is permitted under the current missile regime. Such a capability will likely be important if North Korea remains on the scene and hostile. Such retaliation capability would be a much more dubious proposition with respect to China.

ground forces that could provide significant capability themselves and, more important, leverage the effectiveness of Korean forces. Korea does not want to depend on such assistance; nor does she believe it necessary if she modernizes her forces adequately; and nor does she expect the United States to commit to a defense against China that might be seen as an insulting containment strategy. However, Korea sees the option of U.S. reinforcement as a valuable hedge—one that could be turned from hedge capability to something more refined and exercised if and only if the need arises.

- Korea also sees long-range U.S. precision fires and C⁴ISR as extremely important as a hedge against the possibility that Korea's tactical air forces will prove too vulnerable.
- Thus, Korea greatly values medium- and long-range U.S. Air Force and naval air power (for both strike and C⁴ISR), Navy missiles, U.S. space-based capabilities, and the integrative qualities of the U.S. global command and control system. Consistent with that, Korea values frequent or continual presence of some U.S. naval and air forces in Korea itself.
- Because a purely off-shore balancing role is recognized by all, after considerable discussion, as militarily difficult and unattractive for the United States, Korea, Japan, and other regional countries agree to arrangements providing suitable regional naval and air-force bases, and suitable access arrangements more generally. This includes arrangements for suitable missile defenses if needed.
- Increasingly, the military relationships among the United States and East Asian states are those of cooperative partners engaging in peacetime activities ranging from humanitarian assistance to UN-Sponsored operations. There is a good deal of military-to-military interaction and many joint exercises with no threat in mind and no "containment-style" alliance. In the rosy scenario of the future, China is a frequent participant. Nonetheless, the virtual capability for coalitions to form as needed is evident—

especially by virtue of efforts to assure sufficient interoperability with the United States.⁹

Against this highly speculative background, Figure 2.10 itemizes some of the many possibilities for strategic adaptation. It is, of course, only one future. Still, it provides concrete examples of what might be considered seriously in the years ahead.

In this future, *aerospace* forces, not just air power, loom large. This is so because of the critical role of C⁴ISR (whether accomplished by manned aircraft, unmanned aerospace vehicles [UAVs], or satellites). Also, there is an important role for advanced naval and ground-force capabilities: effective warfare will prove to be distinctly *joint* warfare.

RANDCF152-10

- Rethink, with East Asian partners, desired nature of U.S. presence
- Reduce or remove regular U.S. air and ground forces from Korea
- Establish additional naval home port(s) in East Asia
- Establish network of active and potential regional air bases
- Increase planning for naval-centric operations
- Develop rapid deployment capability of Army and Air Force BMD
- Extend Air Force rapid expeditionary capacity
- Expand medium and long-range Air Force capabilities
- Expand use of space
- Enhance allied capabilities as needed with appropriate-technology systems (e.g., short-range PGMs and C⁴ISR, counter-artillery systems, tactical mobility systems, chemical/biological protection)
- Engage routinely with all Asian militaries; cooperate as partners, multinational humanitarian and security operations
- Hone ability to “link” U.S. and potential-allied systems effectively in times of crisis (e.g., link partners to U.S. infosphere)

Figure 2.10—Illustrative, Speculative U.S. Adaptations in Asia

⁹Some authors foresee a future in which China is the “continental” power and the United States is the “maritime power.” That construct needs to be updated to reflect the role of aerospace forces.

Transforming Forces and the RMA

A central factor in future U.S. capabilities is U.S. success in “transforming the force.” Many of the goals were laid out several years ago (Joint Staff, 1996, 1997), but transforming the force to reflect both the opportunities and necessities of the RMA is quite difficult.¹⁰ The DoD concluded after its QDR that it needed a long-term strategy for doing so. That developing strategy has been discussed increasingly in official documents. Late in 1998, the United States identified the U.S. Atlantic Command as the lead agent for joint experiments and other important matters related to transformation. U.S. ACOM, in turn, has been standing up an appropriate staff and developing concepts and plans for a multiyear effort. Among the lessons learned to date—in the view of the author—are¹¹

- Change is facilitated when the national leaders define stressful operational challenges for the professional military and then request (and insist on) proposed solutions that can be competed against each other with analysis, models and simulations, and field experiments.
- Field experiments are an engine of change because available technology is such that senior-officer participants using that technology become advocates as well as problem solvers. Because so much of the technology is visible in everyday life, its adoption is less stressful than it might otherwise be.
- Despite the several years of discussion since DoD’s *Joint Vision 2010*, a huge gulf still exists between visionary notions expressible in viewgraphs and concrete and workable operational concepts. Achieving the latter will require years of research and analysis, including substantial empirical work, and including extensive use of multiresolution families of models and games. This

¹⁰For a broad range of discussion on the RMA and related matters, see Joint Staff (1996); Joint Staff (1997); Davis, Gompert, Hillestad and Johnson (1998); Hundley (1999); Isaacson, Layne, and Arquilla (1998); Rosen (1991); Barnett (1996); Cebrowski and Garstka (1998); and Defense Science Board (1998).

¹¹For recommendations regarding strategy for force transformation, as well as for detailed suggestions about analytic methodology drawing on models and games, see Davis, Gompert, Hillestad, and Johnson (1998) and Davis, Bigelow, and McEver (1999).

comprehensive work should guide major field experiments; not vice versa.

- Although “RMA technology” such as precision fires, advanced surveillance, and networking have extraordinary potential, they also have major limitations—especially with respect to operations in rough terrain, urban sprawl, or bad weather. Understanding these matters and the associated risks requires sophisticated analysis based on experiments, high-resolution simulation, and more aggregated simulation suitable for exploratory work across diverse situations (Defense Science Board, 1998; Davis, Bigelow, and McEver, 1999).
- Early notions that precision fires could substitute generally for men on the ground were foolish. However, such fires can sometimes devastate attacking forces—making invasion difficult if not impossible.¹² In other cases, they can greatly leverage the capabilities of relatively small maneuver units—if those maneuver units are configured properly (Matsumura, Steeb, et al., forthcoming).
- Static defenses and infantry with little maneuver capability are becoming obsolete, but new concepts for infantry are emerging.

A fitting end to this essay may be the observation that many of this author’s conclusions are consistent with those of Korean authors who strongly believe that Korea should transform the very nature of its forces in the years ahead, with aerospace forces playing a central role. Interestingly, such a transformation could contribute to peace, arms control, and transition if North Korea continues to exist for quite some time (see especially Jee, 1999). This is an important matter because, indeed, unification may *not* occur soon.¹³ It is surely not in South Korea’s interests to defer transforming her forces while

¹²Interestingly, expositors of air power “theory” often mention this key mission grudgingly if at all. Instead, they emphasize classic attacks on fixed targets in the strategic rear, which they claim will be decisive. To this author’s eyes, empirical support for this notion is very weak and the related theory is even more so because the effects of such attacks are so situation dependent. In contrast, the ability of modern air forces to devastate invading ground forces has been clearly demonstrated.

¹³See Moon (1999) for a volume devoted to North Korean transition issues. Much of the discussion suggests that no one should expect unification soon.

waiting for that unification. Instead, it should probably begin that transformation now. That is especially so when one considers how current forces are becoming obsolete and how long it will take to develop an independent Korean capability for the post-unification era when it does arrive. If so, then it will be important to lay the basis for long-term Korean-U.S. cooperation to facilitate that transformation.

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Paul K. Davis is a Senior Scientist and Research Leader at RAND, and a Member of the Faculty of the RAND Graduate School. His e-mail address is Paul_Davis@rand.org.

**GOING INTO THE “UNIFICATION TUNNEL”:
STRATEGIC AND MILITARY IMPLICATIONS**

Dr. Yong-Sup Han

INTRODUCTION

As South Koreans watched the former Soviet Union disintegrate and East European communism collapse in the early 1990s, they were full of expectations that Korean unification would soon be realized. The anticipated collapse of North Korea and the unification of the Korean peninsula have yet to materialize.

Instead, North Korea has turned out to be too resilient to collapse. This phenomenon can be explained by the peculiar circumstances of North Korea and the unique situation on the Korean peninsula. But North Korea's capability as a state has shown steady decline, and unless Pyongyang manages to stave off collapse, Korean unification will continue to remain a clear possibility. Inducing unification, then, will hinge on policy and strategic measures.

A variety of issues will arise in the course of unification involving political, diplomatic, military, economic, social and cultural consequences. Although a majority of South Koreans see unification as an economic problem, it will be an even more serious military problem. The Korean peninsula is subject to an acute danger of warfare. Military tension is higher here than almost anywhere else in the world. Therefore, the most pressing issue will involve eliminating this state of military confrontation and successfully controlling any con-

tingencies under manageable limits to reach a peaceful unification ultimately.

Therefore, much attention is paid to how unification will unfold. Unification itself will be the single, most shocking event to occur in the strategic environment of the Northeast Asian region in the 21st century. It will bring with it a range of issues that will pose new challenges for South Korea, the United States, China, Japan and Russia. These should be addressed in the process of unification. At this stage, nobody can tell for sure how long the unification tunnel will be or how dark it will become inside the tunnel.¹

Among the various scenarios for Korean unification, three have been widely discussed. The first is unification through a step-by-step process of reconciliation, cooperation and peaceful coexistence. This is the unification formula that South Korean government wants to implement. A second scenario involves unification by occupation following armed hostilities that have been initiated by the North. The third envisions unification by absorption, with the South assuming control after a collapse of the North, a scenario that is brought about by one of two secondary scenarios. The first posits the sudden collapse of the Kim Jong Il regime as it fails to resolve economic difficulties in the North and then is toppled by a military coup or widespread turmoil. The second supposes a gradual deterioration of the Kim regime culminating in an ultimate collapse amidst a worsening economic crisis. In the event of the former, the Pyongyang regime may turn to China for help, or a coup or civil instability may escalate into Yugoslavia-style internal strife. Finally, it is also possible that national division may linger on without any tangible movement toward unification.

Inter-Korean military relations and unified Korea's relations with major powers will be determined by which unification scenario actually takes place. If the two Koreas reach a stage of peaceful unification after a phased reconciliation leading to cooperation and peaceful coexistence, inter-Korean military relations will likewise be marked by reconciliation and cooperation, through such measures

¹ Chung Min Lee and Jonathan D. Pollack, *Korean Unification: Scenarios and Implications* (Santa Monica, CA: RAND DRR-1722-A, 1998). This report is an excellent case to analyze full implications of Korean unification scenarios.

as confidence building, personnel exchanges and greater transparency. Military capability could be maintained at much lower levels than now through phased bilateral disarmament. After peaceful unification, the maintenance of a military force capable of coping with regional threats would be adequate. Even in this event, however, North and South Korean forces will not be able to integrate on a one-to-one basis. As seen in the case of Yemen, the integration of military forces of previously divided countries on a one-to-one basis is problematic, as such integration harbors the seeds of future disputes.

If the second scenario takes place, in which North Korea wages war against the South but eventually loses to the South Korean and U.S. combined forces, military integration could be attained with the least potential for future conflict among the given three scenarios. However, this does not mean that unification under this scenario is desirable. The political, economic, social and cultural damage wrought by war can be so devastating that unification by war and the resulting absorption of North Korea's military must be the least likely or most undesirable scenario.

The third scenario concerns the absorption of North Korean forces following the collapse of the Pyongyang regime. In this case, there arises the question of how and when North Korea's military might be absorbed. Germany's experience with integration provides a possible clue. However, application of the German case to Korea requires certain discretion due to differences in the state of military confrontation, experience, historical background and military strength as well as differences in the security policies of other countries in their respective regions.

In sum, the strategic and military implications of unification differ greatly depending on which unification scenario unfolds. Therefore, this paper will deal with each unification scenario separately to draw out the strategic and military implications of each selected scenario starting from unification through gradual integration, and then examining unification through armed conflict, and unification through absorption following North Korea's internal collapse. The continuation of the status quo frequently referred to as "muddling through" will also be briefly mentioned to cover all possible cases.

UNIFICATION THROUGH PHASED INTEGRATION²

South Korea's strategic goal is to achieve unification through peaceful means. The United States fully supports this goal. Other major powers surrounding the Korean peninsula also support peaceful unification. Peaceful unification requires systemic convergence between the two Koreas, which is a long way from the current situation of military confrontation. The two different systems will have to be integrated with each other first in the economic, and later in the political and military realms. For the two systems to converge, a phased approach is required to elicit cooperation instead of confrontation. Significant among the components of this process is arms control.

In particular, North Korea's numerical superiority in conventional forces and its weapons of mass destruction are the most serious security problems that must be tackled in order to ensure a smooth, gradual integration. As of 1998, North Korea maintains superiority over the South in terms of the quantitative strength of its armed forces with some 1.16 million troops, or 1.7 times the South's 690,000.³ In major offensive weapons as well, the North dominates the South by approximately 2 to 1. North Korea has 1.7 times as many tanks as the South, twice as many artillery pieces, 1.3 times as many tactical fighters, and 1.3 times as many armored personnel carriers. In addition, in 1993 and 1994, when the North Korean nuclear question emerged as an international issue, North Korea deployed large numbers of improved 170mm self-propelled guns and 240mm multiple rocket launchers to forward positions close to the demarcation line. This was apparently meant to threaten South Korea's security while calling for nuclear negotiations with the United States. The supremacy of the North's offensive weaponry and the forward deployment of 60 to 70 percent of its arsenal, along with Pyongyang's anticipated blitzkrieg warfare strategy, continue to pose a serious threat to the South.

North Korea's military threat to the South also includes the North's development of long-range missiles and its significant stockpiles of

²Yong-Sup Han, "Unification and Inter-Korean Military Integration," *Korea Focus*, Vol. 6, No. 5, (September/October 1998), pp. 34-45.

³Korean Ministry of National Defense, *Defense White Paper 1998*, p. 303.

chemical and biological weapons. Pyongyang possesses SCUD-B and -C missiles with ranges of 300km to 500km, and has completed deployment of its 1,000km-range No Dong I missile. In fact, the North began in the early 1990s to develop the Taepo Dong I and II as long-range ballistic missiles, with ranges of 2,000–2,500km and 4,000–6,000km, respectively. The development of the Taepo Dong I is complete, while the Taepo Dong II is expected to be operational and deployed by 2000. The North's steady development of long-range missiles seems intended not only for export to the Middle East, but also to ensure the security of the Pyongyang regime. North Korea's nuclear and long-range missile development programs will continue to threaten both South Korea and the stability and peace of the region.

As the two Koreas approach unification, surrounding countries will be concerned about the presence of 1.8 million troops total on the peninsula. The sheer size of the post-unification combined armed forces would be so enormous that neighboring countries will not welcome Korean unification without appropriate arms reduction measures in place well ahead of the event. Even within a united Korea such a large force could be problematic. There is grave concern over how quickly North Korea's huge military can be integrated into the South's and whether retiring North Korean military officers can adapt to civilian life. Some analysts believe that it is probable that at least some unexpected incidents such as the development of local insurgencies or terrorist organizations will occur.

As long as North Korea maintains over one million troops and their surprise attack doctrine, South Korea's security concerns will not be mitigated and unilateral reduction by the South Koreans prior to unification is unlikely. However, if North and South Korea are able to unify following some initial stages of eased military confrontation and peaceful coexistence, answers to these questions can be worked out step by step over time. If unification is achieved following stages of reconciliation, cooperation and peaceful coexistence, the number and extent of unanticipated problems that may arise will be much less than in the case of an abrupt collapse of the North, as the armed forces of the two Koreas will be able to gradually get accustomed to each other. Therefore, to identify what North and South Korea should do in military affairs under phased unification, it will be helpful to apply "backward mapping."

For instance, assuming that unification will be achieved by 2005, then at least some form of reconciliation and cooperation should begin now, with a system of peaceful coexistence attained in the next three to five years. To promote reconciliation and cooperation in the military realm, there should be agreed-upon measures, including a direct hot line linking the military authorities of both sides to discuss military issues and emergency situations. Confidence-building measures should also be instituted. Arms reduction measures including pulling forward-deployed forces back to the rear area should be implemented.

One such channel for military talks is the North-South Joint Military Commission (JMC) that was created on the basis of the Agreement on the Composition and Operation of the North-South Joint Military Commission, which went into effect on May 7, 1992, but has since become a dead letter. The JMC should discuss and embody details of the non-aggression provision stipulated in the auxiliary agreement to the "North-South Accord on Reconciliation, Non-aggression, and Exchanges and Cooperation," which the two Koreas concluded in February 1992.

Concrete issues that the JMC should address include ending direct military confrontation, renouncing the use of force against each other, and establishing practices of resolving bilateral disputes through peaceful means. In addition, the two sides should promote confidence building by mutually controlling the production, deployment and operation of each side's military forces, while creating norms, procedures, systems and practices for phased disarmament, culminating in the introduction of a peace regime. In such a case, the role of the military in influencing North-South relations will decline in favor of the development of political and economic cooperation.

However, should inter-Korean military confrontation remain serious with North Korea rejecting North-South disarmament, the issue of full-fledged arms control will have to be handled through the ongoing Four Party talks. South Korea and the United States have already agreed to resolve arms control and confidence-building issues at the Four Party talks. North Korea will also be obliged to seek resolution of military issues at the Four Party talks once it finds it impossible to effect disarmament through direct talks with the United States.

Over the last fifty years, South Korea has achieved democratization while reducing the weight of its military in domestic politics and the economy. In the North, however, the military has played a pivotal role in maintaining tight control over the entire country. Moreover, in view of the fact that the North Korean military is known to have taken the initiative in perpetrating terrorist acts and threatening all-out attack against the South during the transitional periods, promoting phased arms control to bring the North Korean military under political control will be key to the realization of any gradual integration between the two Koreas.

Therefore, phased arms control is very critical to ensuring security and stability on the Korean peninsula in the process of a gradual integration. Other than conventional weapons and military manpower, North Korea's weapons of mass destruction (WMD) are critical to the success of the gradual integration process between the two Koreas. As witnessed in the case of Perry's visit to North Korea, the United States takes the lead to resolve the issue of North Korea's WMD. The United States is cautiously optimistic about the prospects of North Korea's concession on its WMD programs if the appropriate price were going to be paid to Pyongyang. Without resolving North Korea's WMD problems first, it would be much harder to resolve the problem of North Korea's conventional military problems given the current U.S. policies.

According to the South Korean government's plan, promoting cooperation and exchange between the two Koreas beginning with the economic sector will be conducive to inducing North Korea to respond to South Korea's request for conventional arms control later. That is why the South Korean government addresses confidence building and arms control in the Four Party talks while promoting economic cooperation with the North through the inter-Korean business-to-business contacts.

In the process of arms control on the peninsula, it is inevitable that the issue of U.S. troops be raised. As long as North Korea insists that the issue of U.S. troops should be addressed in the arms control talks, the issue of U.S. troops will not be exempted from the talks. A recent episode in Seoul involving the issue of changing the status of U.S. forces seemed to raise the issue prematurely. However, the issue itself should be raised in the process of arms control talks that may in-

volve the United States, and South and North Korea. Therefore, policymakers and experts should be prepared to address the issue in the context of overall security on the Korean peninsula. Yet, it is not certain whether the issue will be discussed in the Four Party talks because the United States seems to be reluctant to allow Chinese involvement in the issue of U.S. troops.

UNIFICATION THROUGH ARMED CONFLICT

Even while North Korea is experiencing desperate starvation and severe economic difficulties, North Korea's military goal of achieving unification through violent methods shows no change. To that end, North Korea is adding WMD to its existing arsenal. Occasionally, the North threatens the South and the region with missile tests and military intrusions.

South Korea and the United States under the banner of their combined forces will ultimately defeat North Korea in the event of an armed attack. However, the consequences will be dire. Therefore, when there are warnings about limited or all-out attack, the primary objective of South Korea and the United States will be to deter the possibility of war to the maximum extent. However, should deterrence fail, South Korea's objectives will be to limit the range of conflict to the local area in case of a limited attack, and to counterattack and drive out North Korean armed forces in case of an all-out attack according to the South Korean-U.S. predetermined combined war plans, finally achieving unification by force. In managing the war, it is important to separate the Kim Jong Il leadership from North Korean residents so as to punish only those responsible for North Korea's initiation of war.

South Korea's domestic policy will be to manage the early indicator and warning system from the beginning of the crisis in close consultation with the U.S. and Korean Combined Forces Command. Responsive measures will be taken only in consultation with the United States. South Korea may opt to enter crisis bargaining with North Korea in a face-to-face negotiation. Before the crisis, it is very important for South Korea and the United States to communicate with the North Korean leadership their solemn resolve that the two nations and the world would never tolerate any war initiation by the North. If a war breaks out, South Korea and the United States would

fight until they accomplish unification because a war criminal should not be allowed to escape retribution. In this case, the revitalization of the UN Command and multinational forces under the banner of the United Nations will become important to prevent North Korea's ally from helping North Korea.

It is also important for the United States and South Korea to make it clear to China that China must not support a war initiated by the North. The South Korean Government would not be alone in persuading China not to support North Korea. By recounting the history of the Korean War of 1950 to the world, South Korea should mobilize legitimate support from the entire world to punish North Korea.

In regard to the combined operational plan between the United States and Korea, it is necessary to revise when and how to counter-attack North Korean armed forces. Shortening the time from the attack to the counterattacking is crucial to deterring North Korea's attack. If the defense budgets of the two nations are allowed to decrease over time, it would take more days to start counterattacking. This might give the wrong signal to North Koreans particularly when the North Koreans are likely to use military options against the South as a means to get out of a hopeless situation.

In an all-out attack, Japanese logistical support for U.S. forces would be very critical to implementing war plans to the maximum efficiency by taking advantage of the revised U.S.-Japan Guidelines for Defense Cooperation. However, Japanese support should be limited to logistical support inside and around Japan and should not consist of any entry into South Korean territory or its territorial sea so as not to provoke China in such a crisis.⁴

In combating the North Korean armed forces, it is also important for the United States and South Korea to come to terms as to how far they will pursue the North Koreans and who will take the lead in doing so. Concerning this matter, views that the United States should

⁴In this connection, it is very interesting to observe Korean attitudes changing about Japanese support in time of a North Korean attack as shown in the recent public opinion poll conducted by RAND and the *Joongang Ilbo* in March 1999. See Norman D. Levin, *The Shape of Korea's Future: South Korean Attitudes Toward Unification and Long-Term Security Issues* (Santa Monica, CA: RAND, 1999).

not cross the present Military Demarcation Line do not make sense.⁵ Those views can potentially send wrong signals to North Korea.

Just as unilateral actions on the South Korean side are not acceptable to the United States in the case of a North Korean all-out attack, so U.S. actions to hasten to end the Korean War will not be acceptable to South Koreans. The two allies should show North Korea their resolve that a second Korean War initiated by North Korea should be punished with severe penalties—unification by force.

UNIFICATION THROUGH ABSORPTION BY SOUTH KOREA⁶

Red lights on the impending North Korean collapse have been turned on since 1996. In 1996, the former Commander of U.S. armed forces in Korea warned that North Korea was entering the fourth stage and was ultimately approaching collapse.⁷ The former U.S. CIA Director also added that North Korea would collapse ultimately, leaving only the question as to when and how the North would collapse. The former South Korean President Kim Young Sam held the belief that the North probably would collapse during his term. On the whole, however, the impending collapse scenario received more support from abroad than from within South Korea.

Since the defection of Hwang Jang Yop, the collapse scenario has lost popularity and saliency because as one of the most high-ranking insiders of the North, he strongly refuted the reliability of the collapse scenario. According to him, the North Korean regime is too resilient

⁵Caspar Weinberger and Peter Schweizer, *The Next War* (Washington, D.C.: Regnery Publishing, Inc., 1996), pp. 1–98. The authors allude to the point that in case of a Korean War, the United States might end the war being afraid of Chinese intervention and expansion of war into a regional war at the time when it regains the Demarcation Line.

⁶Yong-Sup Han, “Managing the North Korea’s Collapse Scenario,” in Kyong-Won Kim and Sung-Joo Han, *Managing Change on the Korean Peninsula* (Seoul: Seoul Press, 1998), pp. 71–80.

Nicholas Everstadt, “Hastening Korean Unification,” *Foreign Affairs*, March/April 1997, pp. 77–92.

⁷According to General Luck, North Korea will go through seven steps: resource depletion, prioritization, local independence, suppression, resistance, fracture, and realignment. North Korea is assessed to be in the fourth stage. *Chosun Ilbo*, March 31, 1996.

to collapse. He suggested four reasons to support his argument:⁸ (1) The military is so cohesively united around Kim Jong Il that it is impossible for any military coup to occur; (2) Their militant domestic control and tight control over the inflow of external information can detect any kind of grassroots resistance movement immediately; (3) Interestingly enough, North Korean intellectuals believe that the North Korean political regime is fairly stable relative to its South Korean counterpart, and; (4) The leadership has a strong belief (no matter what misperception and miscalculation North Koreans retain) that the North can defeat the South in a war, thus enabling them to find an exit route from collapse even in the worst case. Others add two more assumptions to the ones noted above: North Koreans are accustomed to severe extended famine, and are extremely obedient to the Kim Il Sung and Kim Jong Il heir regimes. Therefore, the North Korean regime has succeeded in controlling without any noticeable resistance and will do so in the future, too. These views are widely supported by Chinese and North Korean leaders and experts.

However, those who strongly believe in a North Korean collapse argue against those who do not. They suggest six points in their counterarguments: (1) The Kim Jong Il leadership has no ability to turn its economy around;⁹ (2) North Korea will collapse as a result of rapid reform because a substantial amount of foreign assistance will only be given contingent upon North Korea's systemic change; (3) The worse the economic problems become, the more defectors and fractures within the leadership will occur; (4) The legitimacy of the Kim Jong Il leadership will be in danger due to strong and wide-ranging resistance once the general population recognizes the bankruptcy and hypocrisy of the *Juche* ideology; (5) As people's resistance becomes organized, a military coup or other type of revolution from the top will take place, and; (6) Change in the political and economic systems will precipitate the end of the state ultimately.

⁸Hwang Jang Yop, "Chosun Affairs," *Chosun Ilbo*, April 22, 1997.

⁹Kyung Won Kim, "No Way Out: North Korea's Impending Collapse," *Harvard International Review*, Vol. 18, No. 2 (spring 1996), pp. 22-25.

Although collapse is thought to be the least likely scenario,¹⁰ this section handles unification through absorption by the South after a North Korean collapse. Herein, the collapse scenario can be divided into two sub-scenarios: implosion (internal collapse) or explosion (external military attack). Since the military attack scenario was explained above, the internal collapse absorption by the South that will follow will be analyzed in this section.

By the term “collapse,” I refer to the case in which the North Korean regime and state system breaks down within a fairly short time span. North Korea’s internal collapse can take place as a result of two cases: a military coup or a revolution from the bottom which may bring about internal disorder and instability, the impact of which will go beyond North Korea’s borders. Millions of refugees and possible conflicts of interest among South Korea and outside powers will follow. Prolonged internal conflicts may result as was witnessed in Eastern Europe at the demise of the Communist system.

Nevertheless, a military coup is very unlikely in North Korea as long as the present relationship between Kim Jong Il and the military continues. Instead, a palace coup may occur in the process of North Korea’s radical economic reform, which the military hard-liners may oppose strongly. However, a military coup might end in failure like the aborted coup attempt in the former Soviet Union in August 1991. Therefore, the only way in which a military coup might succeed is if grassroots resistance spreads out on a national level.

Despite the small chance of popular resistance, a case where the Kim Jong Il leadership fails to provide a minimal level of subsistence to its populace is imaginable. In that event, if the outside world provides a substantial amount of economic assistance and the North Korean regime is required to accept a wide range of reforms, the situation in North Korea might become uncontrollable, thereby resulting in collapse. Even in this case, such events would not happen without a massive information campaign against the North Korean leadership regarding its acceptance of external assistance including massive assistance from South Korea. This means that South Korea and other governments should take actions to flood external influence and in-

¹⁰The Samsung Economic Research Institute, *Korean Unification Scenarios*, October 1996.

formation into the North in the process of radical reform such that North Korea will lose control over its society. Then, people's expectations will rise, ultimately toppling the regime.

In the internal collapse scenario, it is very important for South Korea and the United States to limit their objectives so as not to cause misunderstanding and misperception on the North Korean side, which might cause North Korea to attempt a preemptive strike against the South. In managing the implosion scenario, South Korean objectives would be to confine North Korean instability within North Korean borders, to help restore stability in North Korea in a timely manner, and to make every effort to deter North Korea from considering going to war.

To achieve those objectives successfully, the South Korean government will need to take measures to reduce the deep-rooted aspirations for unification among South Koreans because demands from the South Korean populace for immediate unification might compound the problem to an inextricable degree. It would be more advantageous for the South Korean government to announce that it not only wants the North to restore stability as soon as possible, but is also willing to provide diplomatic and economic assistance to help in this effort. However, South Korea should continue to remind the North Korean leadership that human rights and democratic values should be respected throughout the entire crisis, in efforts to prevent massacres within North Korea like those that continue to occur in Kosovo. In addition, South Korea should not take any military actions against North Korea unless attacked by the North. This would help to limit the crisis within North Korean borders.

Throughout the entire crisis, South Korea should seek collaboration with the United States in managing the crisis. Organizing and running the South Korea-U.S. joint crisis management team would be the best option. In this regard, organizing a joint team on the political level is as critical to successful crisis management as on the military level given the fact that the leadership of the two nations has often exhibited differences concerning how to manage crises on the Korean peninsula in the past. Trilateral cooperation among South Korea, the United States, and Japan is also a requirement in managing the crisis. In this connection, establishing UN forces which include the participation of all countries surrounding Korea will be

necessary to stabilize North Korea as well as to address their security concerns.¹¹

South Korea and the United States should undertake joint measures to prevent China's intervention into a North Korean internal crisis. It has often been pointed out that China would likely intervene in North Korea if they were asked to do so by the North Korean leadership. Some Chinese rejected this case outright when they were questioned about such a scenario saying that there are no pro-Chinese or anti-Chinese factions whatsoever in the North Korean military. If political turmoil in North Korea takes place, it will be more difficult for the Chinese to intervene because China maintains a policy of non-intervention in other nations' internal affairs. Nevertheless, U.S. and South Korean preventive diplomacy with China during times of peace will be more than relevant to effectively deter China from intervening in the North Korean crisis.

If a crisis in North Korea develops into an uncontrollable situation, it will be necessary for the United Nations to intervene according to their peacekeeping and enforcing mechanisms. In this case, the South Korean government will be required to explain fully the rationale to the Korean populace.

THE STATUS QUO AND MUDDLING THROUGH¹²

Most observers inside and outside South Korea predict North Korea will continue to muddle through in the short to mid term. According to research by the Korea Institute for Defense Analyses, most experts believe that North Korea will continue to maintain the status quo for the next five years.¹³

¹¹David S. Maxwell, *Catastrophic Collapse of North Korea: Implications for the United States Military* (Fort Leavenworth, Kansas: United States Army Command and General Staff College, 1996).

¹²Marcus Noland, "Why North Korea Will Muddle Through," *Foreign Affairs*, Vol. 76, No. 4 (July/August 1997).

¹³Korea Institute for Defense Analyses led a joint research to assess prospects for North Korea's change in 1997, and the author took the task to develop future scenarios for North Korea. It was predicted that, within the next three to five years, North Korea will survive. However, more experts predicted that, in the next six to fifteen years, North Korea will collapse.

Although North Korea's economic indicators have already reached the crisis level, it is very difficult to tell whether North Korea is on the verge of collapse solely based on economic indicators. It will take several more years to see whether some political and military indicators are also changing from a normal to a crisis level. The food crisis will be resolved with external assistance for the time being. The military successfully controls the internal situation. Civil society is so underdeveloped that it will take much longer to see any substantial resistance developing. However, most experts believe that North Korea will approach collapse within six to ten years if North Korea does not accomplish substantial internal reform. Unless North Korea challenges the outside world with a second long-range test firing or withdraws from the Geneva Agreed Framework, the outside world will continue their engagement policies. Whether North Korea will succeed in reforming its political and economic system hinges on their ability and determination. However, it will take a long time for North Korea to turn its economy around while maintaining domestic stability. The supremacy of the military over other sectors will continue. Thus, muddling through is the most likely scenario for the short and mid term.

The strategic and military implications for the muddling through scenario are that South Korea and the United States should not risk a fundamental change in their current policies. Their deterrence and defense strategies should be reiterated on a regular basis to prevent North Korea from contemplating use of force or threat to use force. Contingency planning is also required to hedge against the uncertainties arising from North Korea's uncertain future.

POLICY IMPLICATIONS

North Korea is going through changes, however small. Although the outside world is pursuing more reforms and openings in North Korea, North Korea is experiencing changes starting from a controlled opening toward more substantial change. Without change, North Korea simply cannot hold the country together any longer. If the combined engagement strategy of South Korea and the United States works, the gradual integration scenario will unfold. Then, South Korea and the United States should utilize all the channels to

the maximum extent to induce North Korea to take corresponding steps for reform and opening.

From a strategic and military perspective, South Korea and the United States should propose concrete measures to reduce tension and increase cooperation in the military realm. Arms control and substantial arms reduction including the pulling back of North Korean forward forces should be implemented. To accomplish peaceful unification, gradual arms reduction measures are required in tandem with U.S. force reconfiguration. Whether substantial arms reduction measures will be discussed and agreed upon in the Four Party talks is not certain yet. The U.S. and South Korea's current policies show that the United States is engaging North Korea to resolve North Korea's WMD problem while the Four Party talks address the conventional weapons problem. Dividing the military issue into WMD and conventional arms and approaching North Korea separately depending on the issues will not only make it more difficult to achieve the stated goals, but will make it difficult to calculate the security benefits from the negotiations with the North. In addition, under this dispersed approach the price North Korea will extract for concessions will tend to increase.

Therefore, it is necessary to design a more integrated approach in terms of channels as well as substance. South Korea and the United States should design a more comprehensive and integrated approach to address the totality of the security threats posed by North Korea now and in the future.¹⁴ The economic benefits North Korea could get from the outside world should be closely linked to the security costs that North Korea is required to pay. Above all, it is necessary to more closely integrate the South Korean sunshine policy and the U.S. engagement policy to achieve a more desirable outcome from engagement with the North. Approaching the issues of WMD and conventional arms control through a single channel would be more effective in terms of tension reduction with less of a price being paid to North Korea.

¹⁴Richard L. Armitage, *A Comprehensive Approach to North Korea*, U.S. National Defense University Strategic Forum, No. 159, March 1999. See www.kimsoft.com/1997/armitage.htm.

To accelerate the gradual integration process, South Korea and the United States should step up their efforts to reduce tensions on the Korean peninsula mainly by persuading North Korea to draw down its forces. To do so, South Korea and the United States should organize a combined team at the governmental as well as at the expert levels to develop arms control strategies and measures that enhance security and confidence building on the Korean peninsula. Until the two Koreas reach an agreement to reduce tension on the Korean peninsula, South Korea and the United States should maintain their current deterrence and defense strategy and robust military readiness to deter North Korea.

Although the chances for North Korea's collapse are not great, we need to prepare for those contingencies. Otherwise, North Korea may exploit our lack of preparedness. Despite our efforts to reduce North Korean military capabilities, the chances that North Korea might provoke a crisis still remain high because Kim Jong Il rules the country based on support from the military. Because North Korea is well aware that South Korea, the United States, China, Japan, and Russia do not want to escalate a crisis into a war, North Korea will likely exploit our willingness to maintain peace and stability on the Korean peninsula by threatening to go to war as a means to receive more concessions from the external world, as was witnessed in the nuclear crisis of 1994.

To prevent crises, we need to establish regular channels for dialogue between the two Koreas because such interactions could help prevent or reduce crises by lessening misunderstanding and misperception on the North Korean side as well as enhancing confidence and security between the two Koreas. In this regard, the Four Party talks are relevant to resolving the future crises smoothly. This forum contributes to deterring North Korea from going to a war in the event of crisis because China is a party and can play a constructive role in dissuading North Korea from taking unilateral actions through regular contacts with North Korea, the United States, and South Korea. Furthermore, the Four Party talks not only contribute to building a peaceful regime on the Korean peninsula but also to taming Chinese policy and attitudes to coordination between the United States and South Korea in crisis management on the Korean peninsula. The latter would help restrain China from intervening in a Korean crisis.

Should a crisis break out, it is important for South Korea and the United States to take joint measures that had been previously agreed upon. It is very important for the two nations to prevent misunderstanding and to minimize their conflicts of interest. Thus, it is critical for the political and military leaders of the two allies to conduct peacetime exercises to manage crises effectively in the interests of the two nations. Certainly, effective military-to-military exercises have been conducted regularly but nothing equivalent has occurred on the political level. As we experienced conflicts of interest in the race toward the Yalu River during the Korean War, and in subsequent crises such as the USS Pueblo case of 1968, and the Korean Tree Crisis (Murder on the DMZ) of 1976, it is very important for the two allies not to take unilateral actions at the time of crisis.¹⁵ As was witnessed in past crises, there have been major differences in the analyses and policies of the two countries. Therefore, it is very important for the two nations to reach consensus on a political level as well as on a political-military level on how to handle a future crisis on the peninsula. This will include clarifying the following points: when to start counterattacking the North Korean armed forces, how to counterattack, how far the U.S.–South Korean forces will go in retaliation against the North, who will go first and how far North will he go?

To prevent North Korean military efforts to exploit differences between the two allies, the United States should reaffirm its strong commitment to South Korean security on a regular basis, especially when North Korea is believed to be entering the process of collapse. The governments of the two nations should consult on their policies toward North Korea not only to prevent a crisis but also to manage more effectively the North Korean problem during peacetime. A strong U.S. commitment would absolutely reassure North Korea that U.S. resolve is firm and consistent in supporting South Korea in spite of American policy to improve relations with the North. It would also reaffirm that South Korea is an unchanging ally, thus preventing North Korean misperception or miscalculation that the United States might adopt a neutral stance between the two Koreas.

¹⁵Richard G. Head, Frisco W. Short, and Robert C. McFarlane, *Crisis Resolution: Presidential Decision-Making in the Mayaguez and Korean Confrontations* (Boulder, Colorado: Westview Press, 1978).

If collapse occurs, the U.S. role in deterring Chinese intervention into North Korea is very critical. The United States was successful in preventing the intervention of other powers in the German unification. It will be required to play a similar role on the Korean peninsula. As such, an active U.S. diplomacy is expected to prevent direct intervention by Russia, China and Japan in a North Korean scenario. It is also important for South Korea and the United States to facilitate multilateral consultation on security issues in a five-nations forum (without North Korea if North Korea rejects participation) or in a six-nations forum (with North Korea's participation) as a way to help resolve the future crisis on the Korean peninsula effectively. This is especially relevant to finding out the effective means for humanitarian aid necessary for rescuing refugees at the time of crisis.

**CONCEPTUALIZING POST-UNIFICATION DEFENSE
CHALLENGES AND STRATEGIES**

In-Taek Hyun and Woosang Kim

INTRODUCTION

During the Cold War, the bipolar structure of world politics and policies of extended deterrence pursued by the two superpowers provided a basic stability in Northeast Asia. In the post-Cold War period, this stable security order appears vulnerable. Potential sources of instability include: North Korea's nuclear weapons program and continuing aggression against South Korea, which make the Korean peninsula one of the world's most volatile flash points; China's dissatisfaction with the existing regional security order, which Beijing sees as being created and dominated by the United States and its allies; Japan's continuing difficulty in dealing with either its past history or its current financial crisis; and Russia's ongoing domestic turmoil and mismatch between its self image and current international status.

This chapter examines several different long-term regional security environments, based on potential changes in the distribution of power among the main regional actors and their strategies to secure their national interests, and explores the security threats each might pose to a unified Korea. The chapter first identifies four alternative scenarios for the regional security environment in the early part of the 21st century—power transition, hegemonic stability, balance of

power, and “bandwagoning”—each of which would pose its own challenges to a unified Korea.¹ It then discusses which of these alternative scenarios is most likely. The chapter concludes by assessing the implications for Korean defense strategies after unification.

ALTERNATIVE SCENARIOS

Factors Affecting Future Environments

According to theorists of international politics, differential rates of growth among the main actors in the regional system lead to changes in the distribution of power among them. Internal development through industrialization, socioeconomic and political modernization, and technological innovation produces changes in the relative capability of the major actors.² A redistribution of power can also occur through external realignment. Alliance formation is a classic way nations can augment their indigenous capability.³ As a major, fast growing actor increases its capabilities through internal development and alliance formation, it often challenges the dominant power in the system. Conflict becomes particularly likely when a revisionist power is growing fast and challenges a declining, status quo power.⁴

¹For more details about these four scenarios, see Woosang Kim, “Power Transition and the 21st Century Northeast Asian Security Structure,” *Strategy 21*, Winter 1998, pp. 224–252; Woosang Kim, “Korea and the Northeast Asian Security System in the 21st Century,” presented at the international conference, “Future Strategic Cooperation among the United States, Japan, and Korea for Searching Peace in the Korean Peninsula,” organized by New Asia Research Institute, Okazaki Institute, and Pacific Forum CSIS, Sheraton Walker Hill, Seoul, Korea, April 22–23, 1999.

²Robert Gilpin, *War and Change in World Politics* (Cambridge: Cambridge University Press, 1981); A.F.K. Organski, *World Politics* (New York: Alfred A. Knopf, 1958); A.F.K. Organski and Jacek Kugler, *The War Ledger*, (Chicago: University of Chicago Press, 1980).

³Woosang Kim, “Power Transitions and Great Power War From Westphalia to Waterloo,” *World Politics*, Vol. 45, October 1992, pp. 153–172; Woosang Kim, “Power, Parity, Alliance, and War from 1648 to 1975,” in ed. Jacek Kugler and Douglas Lemke, *Parity and War* (Ann Arbor: University of Michigan Press, 1996); Woosang Kim and James Morrow, “When Do Power Shifts Lead to War?”, *American Journal of Political Science*, Vol. 36, November 1992, pp. 896–922.

⁴Gilpin (1981), Organski (1958), and Organski and Kugler (1980).

A number of studies have suggested that the growing economic power of the People's Republic of China (PRC) will eventually result in its catching up with the United States and produce a power transition between them. There are many reasons for this prediction. China has maintained a very high growth rate for more than a decade. Its fast-growing economy has also fueled a massive arms build-up. By the years 2020 to 2040, according to *The Economist*, China's economy will be about 40 percent larger than that of the United States. Including other factors like "long-range military power, efficient foreign policy machinery, public support for vigorous foreign policy, and material interests abroad," China is the only potential power that can challenge the United States in the existing system.⁵

However, this view of China as a potential regional hegemon is not universally held. Some suggest that the PRC's power is in fact still quite weak and is likely to remain so for years to come. The internal power struggle since the death of Deng Xiaoping, moreover, is not yet settled. And contested sovereignty issues like Taiwan and Tibet are nowhere near being solved. The growing economic gap between the inner and coastal parts of China is another politico-economic problem that will be very difficult to solve.⁶

To be sure, Russia's stabilization and potential growth and Japan's continuous economic growth and military build-up could provide other kinds of power transitions. But China's potential economic growth and impact make it the most conspicuous potential challenger. This analysis, therefore, gives most weight to the PRC's potential in identifying alternative scenarios for the future regional security environment. It also assumes that Korea is unified and that the United States maintains its current economic conditions. A key factor at the systemic level, therefore, is whether the PRC grows faster than the United States, Korea, and other Asian countries.

⁵John Naisbitt, *Megatrends in Asia* (London: Nicholas Brealey, 1995); Joseph Nye, "China's Re-emergence and the Future of the Asia-Pacific," *Survival*, Vol. 39, Winter 1997, pp. 65-79; *The Economist*, October 1, 1994, p. 4; *The Economist*, January 3, 1998, p. 18.

⁶Nathan and Ross (1997).

A second factor affecting future regional security environments is each actor's national interests, goals, preferences, and will. Starting with the United States, two types of foreign policy can be identified: a policy of internationalism or of engagement; and a policy of "splendid isolation." Historically, the United States has pursued one or the other of these broad policies. Since the United States became the region's dominant power, however, it has pursued a policy of internationalism.

According to a 1996 report by the Commission on America's National Interests and a separate report by the Center for Strategic and International Studies (CSIS), the "vital" national interests of the United States in the region include the following: preventing the emergence of any regional hegemonic power; containing the proliferation of weapons of mass destruction, particularly nuclear but chemical and biological weapons as well; controlling the spread of missile technology; and ensuring continued military, political, and commercial access to and through the region.⁷ These interests suggest that the United States will pursue engagement, or a broad policy of internationalism, in the years to come. Recently several leaders of the United States, including Secretary of Defense William Cohen, have confirmed this and indicated their willingness to maintain a forward military presence in Korea even after unification. Having said this, one never knows when this policy may change. A change in the regional security environment as drastic as China's overtaking U.S. regional dominance, for example, could compel Washington to reconsider its policy of internationalism.

In the case of China, its foreign policy is based on two main sets of principles: the "one China" principle; and the five principles of peaceful coexistence. Though the "one China" principle has been honored by most of the countries in the world, China is not satisfied with recent changes in the relationships between Taiwan and other major powers. The United States, Russia, Japan, and South Korea are all improving their unofficial ties with Taipei. The PRC is particularly unhappy with the explicit U.S. support for Taiwan, which it claims violates the "one China" principle. Such views reflect China's

⁷Zbigniew Brzezinski, Lee Hamilton, and Richard Lugar, "Foreign Policy into the 21st Century: the U.S. Leadership Challenge," (Washington, D.C.: The Center for Strategic and International Studies, 1996).

broader unhappiness with the existing regional order. The strengthening of U.S. ties with Japan, and Washington's public statements about maintaining a forward presence in Korea and Japan even after Korean reunification, contribute to China's dissatisfaction. The PRC fears being "squeezed out" by the United States and its allies. In this sense, U.S. leadership and active engagement in the region represents one of the most important factors contributing to China's dissatisfaction with the existing regional security system.

Japan and Russia could also become dissatisfied with the regional order. Japan, for example, is not a "normal" state—in the sense that it is constitutionally prohibited from possessing full-fledged armed forces. Although the Japanese do not seem ready to revise their constitution, there always remains this possibility. In fact, the recent Japanese "National Defense Program Outline" provides for a strengthening of Japan's power projection and anti-missile defense capabilities and an increased role for the Self Defense Force in UN peacekeeping operations. For its part, Russia is also dissatisfied with the current economic and security conditions in the region. One good example can be seen from recent complaints by Russian leaders about the exclusion of Russia from the "Four Party talks" on Korea. More broadly, Russian leaders have often expressed dissatisfaction with the lack of respect they receive from other major powers.

There are qualifications in both cases, however. Japan's becoming either a "normal" or a "re-militarized" state will be heavily influenced by U.S. willingness to remain engaged in the region. As long as the United States maintains its engagement policy through its strong alliance with Japan, Tokyo is not likely to change its current policy drastically. Similarly, unless the United States loses its current dominant position and gives up its policy of internationalism, Russia's security activities in the region will be restricted. Therefore, the choice the United States makes—whether to maintain a policy of internationalism or revert to isolationism—will have a critical impact on the future regional security environment. For this reason, this chapter gives most weight to the potential U.S. roles in identifying alternative scenarios for the future regional security environment.

Identification of Alternative Scenarios

These factors—the potential for a major change in U.S. policy and China’s potential for successfully challenging the United States and achieving regional dominance—constitute the core variables around which the scenarios are constructed. Table 4.1 indicates the different combinations of each of these variables and the resulting four alternative scenarios.

If the United States maintains its current “internationalist” foreign policy of active engagement in Northeast Asia, forward deployment of forces, and military alliances with the regional powers, there are two possible scenarios, depending on the prospects for the PRC. The first, resulting if the PRC fails to catch up to the United States in national power, is a strengthening of stability based on U.S. regional dominance (“hegemonic stability” scenario). The second, resulting if the PRC does succeed in catching up to the United States, is a power transition between the United States, a declining status quo power, and the PRC, a rising revisionist power (“power transition” scenario).

As long as the United States maintains its hegemonic status through a preponderance in power over other potential challengers and its policy of internationalism, the Northeast Asian regional system will be very stable based on U.S. hegemony. In this case, the United States will establish and maintain systemic order through economic, political and security-related public goods, while securing its vital interests through the existing regional order. Japan will be a satisfied power, since it sees the existing order as assuring Japan its full share of benefits. Korea will be satisfied as well because the U.S. sphere of influence will promote stability throughout the region.

Table 4.1
Four Scenarios

	U.S. Policy	PRC Prospects	Scenario
Factors	Internationalism	Failure of challenge	Hegemonic stability
		Success of challenge	Power transition
	Isolationism	Failure of challenge	Balance of power
		Success of challenge	Bandwagoning

In this "hegemonic stability" scenario, the United States will see its alliance with Japan as beneficial to maintaining regional order and will keep it. Washington will probably not maintain its alliance with Korea, however. The PRC and Russia will still be dissatisfied powers in the region. Since U.S. power is preponderant, however, the regional system is expected to remain in a state of equilibrium.

If, on the other hand, the PRC successfully catches up with or even overtakes the United States, then the "power transition" scenario will materialize. In this scenario, the United States will try to protect its sphere of influence in the region and maintain the existing security order despite its relative power decline. The United States will also want to strengthen its military ties with both Japan and Korea and try to overcome the challenge from China. For its part, the PRC will be dissatisfied with the status quo, since it will have grown to full power after the existing regional order was established and the benefits were allocated. China, therefore, will try to change the status quo and rewrite the regional security order in its favor. In this kind of situation, a major war between the declining status quo power and rising revisionist power is highly likely. This power transition scenario suggests increased military and political roles for Japan and Korea—the principal U.S. allies in the region.

The above two scenarios are plausible only if the United States adopts a policy of active engagement in Northeast Asia through forward deployment and military alliance with regional powers. But, what if the United States decides to change its policy from "internationalism" to "isolationism?" This would lead to two other scenarios. One, labeled "balance of power" above, obtains if the PRC fails to catch up with the United States in national power. In this case, three more or less equal powers—the PRC, Japan, and Russia—will check each other's aggression or territorial ambitions by forming temporary alliances and other balance of power mechanisms. That is, the threatening country will provoke others to align against it. Although the United States will remain the strongest power in the system, it will be involved only minimally in regional politics. Instead, as long as vital U.S. national interests are not threatened, the

United States will pursue a policy of “splendid isolation”—essentially the policy Great Britain adhered to during the 19th century.⁸

The balance of power scenario suggests that the United States will not keep its military alliance ties with Japan or Korea. Unless any one great power tries to break the status quo, the United States will remain uninvolved. Only when the regional status quo and its national interests in the region are threatened will the United States play the role of “balancer.” In this kind of situation, Japan will not rely on the United States for its security protection. Instead, Japan will increase its military capabilities and change its constitution to become a “normal” state. Three powers—Japan, the PRC, and Russia—will compete against each other for influence in the region. The territorial disputes over islands in the South China Sea, the Senkaku or Diayutai islands between China and Japan, and over four northern islands between Russia and Japan will also be major destabilizing factors. Korea may remain as a “buffer state” in between these three competing great powers. In the balance of power scenario, the regional system is in a state of equilibrium. But it will be a very unstable one, since tipping the balance over in one’s favor could mean a war among great powers in the region. In this scenario, heated competition between the PRC and Japan would be expected.

The “bandwagoning” scenario is one in which the United States adopts a policy of isolationism and the PRC becomes as strong as the United States in its national capabilities. In this scenario, the PRC would emerge as the regional hegemon. The United States, instead of balancing the PRC’s rapidly increasing power through tightening its existing alliance relations, would sever its alliances with both Japan and Korea and accommodate China’s regional hegemonic status. The more the emerging regional hegemon provides special treatments to the United States, the more likely the United States is to adopt an appeasement policy toward the PRC. Other small and weak neighbors of the emerging regional hegemon will “bandwagon” as well, since they will be the first victims of the rising power’s potential expansionism.⁹ Korea, because of a lack of capabilities to

⁸Hans Morgenthau, *Politics Among Nations* (New York: Alfred A. Knopf, 1973).

⁹Stephan Walt, *The Origins of the Alliances* (Ithaca: Cornell University Press, 1987).

stand alone, will also bandwagon to the threatening power. The stronger the PRC becomes, the more likely Japan and Russia would be to appease it. Since most of the remaining powers are likely to accommodate the PRC's regional hegemonic status as well, war is less likely. In this sense, the regional system is expected to be more or less stable. U.S.-Japan ties, the U.S.-Korea ties, and the triangular ties among the United States, Korea, and Japan are least likely to be maintained in this scenario.

THE MOST LIKELY SCENARIO

All four scenarios seem plausible. Which one is most likely? One way to answer this question would be to analyze the future of U.S. policy and the status of Chinese power in this region.

By all criteria, the United States has been and is a major player in this region. Since the advent of the post-Cold War, however, a prolonged and heated debate has arisen among both students and practitioners of American foreign policy over what direction U.S. policy should take in the future. One answer some provide is toward isolationism.

Applying their revisionist views to U.S. defense policy in Northeast Asia, for example, Johnson and Keehn maintain that U.S. military engagement in this region is not in the interest of the United States. Northeast Asia is the most economically dynamic region in the world. Given this reality, continued U.S. military engagement has become a primary source of instability—both because it ensures the continuation of ongoing conflicts and because it prevents the regional states from taking steps to solve their own problems.¹⁰ Moreover, they argue, continued U.S. military engagement is unwise because it prevents the nations of the region from assuming the full costs of their own defense and keeps the United States burdened with these unnecessary expenses.

In similar fashion, Layne argues that in a multipolar world, which is inevitable, U.S. efforts to prevent the emergence of new powers like Japan and Germany is counterproductive: Such efforts only *expedite*

¹⁰Chalmers Johnson and E. B. Keehn, "The Pentagon's Ossified Strategy," *Foreign Affairs*, July/August 1995.

the rise of new great powers, while increasing the likelihood that they will adopt “balancing behavior” against the United States after their emergence. For these reasons, Layne urges the United States to “adjust to the inevitable emergence of new great powers” and follow “a policy of strategic independence” by assuming the posture of an offshore balancer.¹¹ He asserts that the United States could rationally adopt buck-passing strategies that force others to “go first,” so that emerging great powers could be contained by others without the United States having to risk direct confrontation.

Such revisionist arguments are replete with unexamined hypotheses and misunderstandings about international realities. They thus require more careful scrutiny. Johnson and Keehn’s argument for disengagement simply begins and ends with assertions. It merely asserts that new conditions exist and the withdrawal of U.S. troops from the Asia-Pacific region is therefore warranted. Quite contrary to their assertions, however, U.S. allies in Northeast Asia are not free-riders at all. They actually have increased their contributions substantially, reducing the net costs incurred by the United States. Since the mid-1980s, both Korea and Japan have shared huge defense costs for the U.S. troops stationed there. In fact, former U.S. Defense Secretary Les Aspin, in his hearing before the U.S. Congress, disclosed that the level of South Korea’s cost sharing was 78 percent of the total stationing costs. In the case of Japan, it was 76 percent. These figures were much higher than that of Germany, which was only 33 percent.

Moreover, the U.S. government, in numerous reviews of its overseas deployment, has decided to maintain a presence in the Northeast Asian region. It is difficult to believe that a military presence would be maintained if it was clear that such a policy was not in U.S. strategic interests. Even more important is the fact that the continued U.S. presence in East Asia has significantly contributed to regional stability and peace. Thus, it is questionable whether U.S. withdrawal is a sound policy—let alone one that will be realized in the post-unification era. It is certainly possible that changes will be made in the size and nature of the forces that the United States has

¹¹Christopher Layne, “The Unipolar Illusion: Why New Great Powers Will Rise,” *International Security*, Vol. 17, No. 4 (Spring 1993), pp. 45–47.

stationed in the region, depending on the evolution of the situation. Even in this case, however, important adaptations will be made in the way the U.S. military presence in Northeast Asia is managed to ensure its effectiveness and viability.

Layne's arguments are similarly misleading. First, the post-Cold War East Asian system is not a multipolar system, in the sense of two or more relatively equal powers competing with one another. It is rather close to a system of American hegemony. Moreover, it is one thing to say that the overwhelming preponderance of U.S. power might not be sustainable; it is another thing to say that the rise of Japan and Germany as new great powers is unavoidable. The *desirability* of Japan and Germany becoming new great powers is even more problematic. Such an assertion is both ahistorical and unrealistic. The voluntary decline of U.S. hegemony, which Layne advocates, would simply inspire an unnecessary power transition in the region, creating in its wake a power vacuum and major instability. The withdrawal of U.S. power, moreover, would critically undermine alliance relationships. Thus, if the would-be challengers are not benevolent, which they neither are nor can be by nature, the post-unification international situation, especially in the Asia-Pacific region, will be filled with threats, skepticism, and fear. This would be serious enough to alarm most countries in the area.

These revisionist arguments represent a form of isolationism. The withdrawal of the U.S. military power would pose a high likelihood of a major power vacuum in the region—not only a power vacuum but a severe power struggle between potential hegemonies trying to fill the gap left by the withdrawing power. This would produce instability and, at worst, war in this region. History shows this well. The power vacuum in the late nineteenth century, for example, led to a major war between China and Japan.

Contrary to the arguments of the revisionists, the United States is now pursuing a policy of deep engagement in this region. It has sustained alliances with both Japan and South Korea. In particular, it has stepped up its security relationship with Japan through the new "Defense Guidelines" of 1996. This reflects the U.S. view of the U.S.-Japan alliance as the most crucial axis for regional stability. Thus, while there may be some adjustments in U.S. strategy in the new security environment, they are not likely to be revolutionary.

The status of Chinese power in the post-unification era is the second way to answer the question about the most likely future scenario. China certainly has the potential to become a would-be challenger to U.S. dominance. At present, however, China is neither a rising hegemon nor even a rising challenger. China is now a sort of reluctant supporter. To be sure, China has the ambition of becoming a major power in this region. The question is whether it will attain a "rising hegemon" status of the sort that can compete with the United States in the foreseeable future. At best, this is a possibility, not a probability. It is not easy for China to reach even the status of the former Soviet Union in the next two decades or so. The end of the Cold War tells us that even the former Soviet Union could not challenge the United States. On this point, Wohlforth offers an interesting interpretation. Explaining the post-1989 transformation of world politics, he argues that during the Cold War the Soviet Union never reached a hegemonic status. It was a declining challenger, but not a declining hegemon.¹² Thus, system change could be possible without hegemonic war.

The main point is that the presence or absence of a "rising hegemon" is the key to any power transition in this region. The main question is whether China can assume this status or not. This will be a daunting task, at least over the next two decades. Indeed, China will have difficulty even reaching the status of a "rising challenger" for a variety of reasons:

- While China has nuclear weapons, it is not a military power like the United States and Russia. China's conventional military power is far behind that of both countries, even though Beijing has considerably increased its military capability since it launched its defense modernization program in the early 1980s.¹³ China has no blue-water capability, for example, and hence only limited ability to project conventional forces beyond its borders. China lacks mid-air refueling capabilities. Airborne early warning capabilities are poor. It is known that China pro-

¹²William C. Wohlforth, "Realism and the End of the Cold War," *International Security*, Vol. 19, No. 3 (Winter 1994/95), pp. 91–100.

¹³*The Military Balance*, 1998/99.

cured just one A-50 for its airborne early warning in 1997.¹⁴ That is the country's only airborne early warning system. Along with airborne early warning, C4I and surveillance are crucial for effective air operations. In these areas, China has many miles to go. To be sure, China has modernized its combat aircraft. It has produced the J-10 and license-produced the SU-27s. For the SU-27s, China procured 26 SU-27s from Russia and agreed on license-production with Russia. But even with a massive military build-up plan, it will take many years to acquire advanced air power.

- China's technology, both military and commercial, is also far behind that of the advanced industrialized countries. Future military power depends largely on technology. In an era of dual-use technologies, there is no difference between commercial technology and military technology. A superiority in the commercial sector transfers into one in the military sector. Technology is also the most important factor in the "revolution in military affairs" (RMA).¹⁵
- Although China's economy is one of the most rapidly growing in the world, it is to a great extent dependent on the United States. The growth power of the Chinese economy certainly appears formidable. Thus, optimists on the Chinese economy predict that, in terms of GNP, it will exceed the U.S. economy by 2020. This is plausible but, at present, only a hypothesis. It is questionable whether a dependent economy like China can exceed the United States, even if only economic factor is considered.
- China's domestic politics is also a major concern. China maintains an odd amalgam of a market economy and a Communist political system. A market economy, by its nature, blossoms in commercial liberalism. A Communist political system hinders this from happening. How, and until when, can China maintain this odd marriage? A possible result is domestic political instability. A second and third Tienanmen Square incident are always

¹⁴Paul H. B. Godwin, "From Continent to Periphery: PLA Doctrine, Strategy and Capabilities Towards 2000," *The China Quarterly*, June 1996, p. 478.

¹⁵Lawrence Freedman, *The Revolution in Strategic Affairs*, Adelphi Paper 318.

possible, negatively impacting China's vibrant economy and political stability.

For these reasons, even though all four scenarios are conceivable, the first scenario—"hegemonic stability"—is most likely.

KOREAN STRATEGY FOR THE POST-UNIFICATION ERA

What should Korea's strategy and role be in the post-unification era? Korea's strategy should fit all the scenarios, even though one is more likely than the others. The Northeast Asian international system in the post-unification era will still be complex in nature. On the one hand, the system will not likely be in an extreme state of flux, unless the United States completely withdraws in this region. And war will not be likely, even though there will still be rivalry among the regional powers—especially between China and Japan. But this rosy picture of a peaceful Northeast Asia is only one possibility. The role of international institutions in providing regional peace and stability is not likely to increase rapidly. Economic interdependence in this region will continue to be growing, but it alone will not be able to resolve differences and diversity among Asian nations.

Given this situation, Korea's strategy should be four-fold. First, a unified Korea should not and will not pursue an expansionist policy. It will still be the smallest state in Northeast Asia, because the objective imbalance in size and population will continue even after unification. A unified Korea will be far from being a major regional power according to most measurements of power. Its population will be growing as a result of unification, but it will have many political and economic problems. Sustained economic growth only seems possible in a very successful economic integration. Political integration is not an easy task. Massive social problems are also difficult barriers to overcome. Thus, the primary goal of a unified Korea will be domestic stabilization. On the basis of domestic stabilization, a unified Korea's basic policy objective should be to play a constructive role for a stable Northeast Asian order.

Second, in doing this, the role of the United States will be crucial, because any regional balance of power depends on the United States. American isolationism, if it were realized, would change the whole

climate of Northeast Asia's regional order. In order to maintain stability and peace, Korea should support active U.S. leadership and engagement in this region. This will remain a firm policy guideline for a unified Korea. The United States should play an appropriate role for stability and peace as an honest broker or benevolent balancer. Even if a unified Korea is the smallest state in this region, the importance of its location is not trivial. It is positioned in the middle of Northeast Asia, especially between the two regional rivalries of China and Japan. Thus, a unified Korea could play a constructive role for stability and peace.

Third, a unified Korea should maintain its alliance with the United States. It would also be in the common interests of both Korea and the United States to maintain U.S. forces on the Korean peninsula in order to maintain regional stability. Therefore, a purely "political alliance" without a U.S. military presence is not desirable. In the post-unification period, the major objective of the alliance should be to enhance regional stability and peace. The level of American forces in Korea will depend largely on the situation at that time. Either the rise of Chinese hegemonism or the presence of hyper-nationalism would increase the number of American forces stationed in Korea. On the other hand, Chinese democratization and the development of effective multilateral security mechanisms would diminish the size of the American military presence. In either event, the Korea-U.S. alliance should be a lynchpin of the post-unification environment. In this sense, we need strategic interdependence. Strategic interdependence needs close cooperation among allies to adjust to the new environment. The United States will locate itself at the center of gravity. U.S. allies will share the burdens.

Fourth, one of unified Korea's basic strategic objectives is to remain non-nuclear. A unified Korea will never pursue nuclearization. This does not mean that a unified Korea will rapidly decrease its conventional military power, however. Rather, a unified Korea should have an appropriate amount of military power. As a result of unification, many assume that Korea's military power will naturally increase. Actually, any such increase will be minimal at best. While the current North Korean military power is formidable, after unification most of the North's weapons will be useless. A unified Korea should remodel its military power, abolishing nearly all the North Korean military power. Even so, Korea's conventional military power will be

much weaker than that of its neighboring countries if current trends continue. Table 4.2 below shows this well.

South Korea's military power, in terms of critical military forces, is far behind that of Japan and China. A unified Korea's power projection capability is not likely to grow rapidly. Military personnel, if the North Korean personnel will be simply added to that of South Korea, will be over 1.5 million in the post-unification era. But, Korea doesn't need such a large army. It is only a burden, but not an asset. Rather, Korean military power should be stepped up in terms of quality. Most of North Korea conventional weapons, except some

Table 4.2
Military Balance

Military Force	ROK	Japan	China
Defense expenditure (1997, US\$)	14,732	40,891	36,551
Air force	88 F-16C/D 195 F-5E/F 130 F-4D/E	59 F-1 110 F-4EJ 194 F-15/DJ	400 Q-5 1,800 J-6/B/D/E 500 J-7 150 J-8 46 SU-SK/UBK 120 H-6 300 H-5
Airborne early warning		14 E-2C 4 Boeing E767 (AWACS)	
Navy			
Destroyer	5	9	18
Frigates	33	48	35
Submarines	6	16	63 (Strategic 1, Tactical 62)
Strategic Missile Forces	None	None	1000 ICBM 100 IRBM/MRBM

SOURCE: *The Military Balance* 1998/1999; *Hand Book For Defense* 1999, Japan, 1999.

advanced aircraft,¹⁶ are outmoded and thus useless. Moreover, the weapons systems of the North and the South are totally different. Thus, they are not interoperable. Because of this, even after unification, Korea's military power will not be improved greatly. Rather, Korea will have to pay huge costs for destroying outmoded and useless weapons systems.

A weak Korea will not help bring about stability in this region. Instead, a stable and strong Korea could play a constructive role for regional stability. As a bridge between Japan and China, it is desirable that Korea have somewhat reasonable military power. In particular, Korea should focus on critical military forces. These consist of three important elements: advanced weapons systems, C4I/BM (command, control, communication, computers, intelligence, and battle management),¹⁷ and skill.¹⁸ Advanced weapons systems include advanced aircraft and ships, various smart bombs, and sophisticated missiles. Currently it is believed that skill or training and technology is one of the most important military powers. Among these elements, priority should be given to the build-up of air power.

CONCLUSION

This chapter has examined post-unification scenarios and Korea's strategy. The chapter described four different scenarios: American hegemonic system, regional balance of power system, power transition, and bandwagoning.

Among these scenarios, even though all four scenarios are plausible, the first is most likely. The United States, unless it voluntarily withdraws from the region, will remain as a hegemon or at least the first among equals. China might challenge the United States, but its power will remain very limited for at least the next two decades.

¹⁶North Korea has now 30 MiG-29 and 35 SU-25.

¹⁷Lawrence Freedman, op., cit., p. 12.

¹⁸Stephen Biddle, "Victory Misunderstood: What the Gulf War Tells Us about the Future of Conflict," *International Security*, Vol. 21, No. 2 (Fall 1996); Daryle G. Press, "Lessons from Ground Combat in the Gulf: the Impact of Training and Technology," *International Security*, Vol. 22, No. 2 (Fall 1997).

Despite the PRC's potential as a rising challenger, it has many problems to solve in order to become the hegemon in this region.

What should Korea's strategic objectives be in the post-unification era? First, a unified Korea must pursue a defensive strategy oriented to its national survival. It should pursue a peaceful and non-aggressive policy toward neighboring countries so that it can play a constructive role in the region.

Second, in order to preserve peace and stability in this region, the presence of the United States as an honest broker or a benevolent hegemon is absolutely essential.

Third, a rapid decrease of Korea's military capability after unification will not help stabilize the region. Rather, a unified Korea will have to possess an appropriate level of military power.

Fourth, in doing so, a unified Korea should increase critical military forces such as advanced weapons systems, C4I/BM, and skill. Among these, air power is the most crucial factor.

**CHANGING THREAT ENVIRONMENT, FORCE
STRUCTURE, AND DEFENSE PLANNING: THE SOUTH
KOREAN CASE¹**

Chung-In Moon

INTRODUCTION

Despite the global diffusion of a “post–Cold War” ambiance since the late 1980s, Northeast Asia has not been able to escape the lingering inertia of the Cold War. On the contrary, North Korea has become an even more dangerous regional spoiler with potential nuclear capabilities and their means for delivery, as reflected in the launch of its Daepo Dong II missile. Newly emerging tensions between China and the United States and the ongoing debate over Theatre Missile Defense (TMD) between the United States and its allies underscore the strategic instabilities deeply embedded in the region. These instabilities have fostered a new debate in South Korea over the country’s future military strategy and force structure.

Two schools of thought have dominated the debate. “Softliners,” inspired by the Kim Dae Jung government’s “sunshine policy” of seeking peaceful coexistence with North Korea through cooperation and exchange, call for a more reserved defense posture and the reso-

¹This chapter was prepared for presentation at an international conference on “Emerging Threats, Forces Structures, and the Role of Air Power in Korea,” organized by the Center for International Studies, Yonsei University, Seoul, Korea, June 11–12, 1999. I would like to thank Byung-chull Kang and Jong-soo Chun for their research assistance. Comments are welcome.

lution of regional strategic instability through multilateral diplomacy. “Hardliners,” on the other hand, criticize the government’s defense posture as being too idealistic—and even “appeasing” North Korea. Further asserting that “softliners” seriously underestimate newly emerging regional security threats in the post–Cold War era, they advocate a more assertive strategic planning effort and robust force structure.

What is missing in this “softliner-hardliner” debate is any causal chain of reasoning linking security environment, threat perception and assessment, strategies and tactics, force structure, defense planning, and weapons choice. For force structure, defense planning, and weapons acquisition are by their nature a function of overall security environments, threat assessments, and strategies and tactics. Deliberating on force structure and defense planning without a sound assessment of shifting security threats and effective formulation of military strategies and tactics is inconceivable (Bartlett 1986). The current debate on force structure, defense planning, and weapons choice in South Korea, however, appears to pay little attention to this causal chain of reasoning.

Against this backdrop, this chapter seeks to explore appropriate strategies and force structures for South Korea by analyzing shifting regional security environments and threats. The first part of the chapter examines four scenarios involving alternative future security environments surrounding South Korea. The second part assesses South Korea’s existing strategies and force structure in terms of a variety of regional and peninsular threats. Part three identifies alternative strategies and force structures to prepare for the 21st century. The chapter concludes by highlighting several implications for force structure and defense planning in South Korea.

II. THE KOREAN PENINSULA AND REGIONAL SECURITY ENVIRONMENT: STRUCTURE OF NEWLY EMERGING THREATS

South Korea’s security environment during the Cold War was relatively straightforward. Being dictated by the logic of bipolarity, extended deterrence between the Soviet Union and the United States was able to maintain strategic stability on the Korean peninsula.

Inter-Korean relations and subsequent threat perceptions were greatly influenced by strategic interactions between Moscow and Washington. As Kenneth Waltz (1979) aptly postulated, the bilateral alliance ties that were solidified through bipolar confrontation (e.g., South Korea–U.S., North Korea–USSR) facilitated the confluence of threat perception and complementarity of strategic interest among allies, resulting in unusual strategic stability on the Korean peninsula.

Since the end of the Cold War, however, the bipolar structure of world politics has rapidly evaporated, and the security environment surrounding South Korea has become more fluid than ever. Table 5.1 conceptually describes four major scenarios—each involving a different regional threat environment for the post–Cold War era—based on changes in the U.S. security commitment and policies of the major regional actors (Kwon and Chung 1998; Chung 1998; Bae 1998; *Defense White Paper* 1998).

The first scenario (I), which involves a basic continuation of the status quo, is based on two premises: the continuing presence of U.S. troops in the South; and a continuation of military threats from North Korea. This scenario also assumes that no major regional actor engages in hostile military action against South Korea. Thus, the scenario offers a portrait of the current security situation on the Korean peninsula. As long as the United States maintains its ground (2nd Division) and air force (the 7th Air Force) units in South Korea, and regional actors remain neutral or friendly, credible military deterrence can be maintained on the Korean peninsula. North Korea cannot easily prevail over the South, despite its quantitative superiority in conventional forces, adherence to the old revolutionary line of emancipating the South from American “imperialist rule” by force,

Table 5.1
Security Environment and New Threat Structure

	North Korean Threats	Regional Threats
U.S. engagement	I	II
U.S. disengagement	III	IV

and potential threats of weapons of mass destruction. And North Korea's delayed force modernization, questionable combat readiness, backward command, control, communication, and intelligence systems, and fragile logistics support will become major barriers to military adventurism. In this environment, therefore, North Korea is not likely to be in the position to stage an all-out military invasion (*Defense White Paper* 1998).

Under this scenario, however, other forms of military provocation by the North cannot be ruled out. One possibility is all-out or limited artillery and/or missile attacks. North Korea has forward-deployed an array of short and medium range artillery pieces and missiles along the DMZ, which can cover most of the Seoul metropolitan area.² North Korea could stage artillery/missile attacks under two conditions. If South Korea, the United States, and Japan abandon a soft-landing or engagement policy and actively seek a hardline posture of containment and punishment, thereby threatening its regime and national security, North Korea could consider the use of artillery and missile attacks. In the event that negotiations over nonproliferation were to fail and the United States or South Korea were to undertake surgical strikes on suspected nuclear or biochemical weapons facilities, the North could also engage in such attacks in retaliation.

A second possible form of military provocation is infiltration of special command forces in the rear areas of South Korea. North Korea clearly has not yet given up its strategy of communizing the South by force (Han 1998:77). Recent submarine infiltration incidents, active covert operations, and unfailing co-optation of pro-North Korean sympathizers all demonstrate its ongoing commitment to nonconventional warfare. Given this commitment, acute social, political, and economic instabilities in the South could provide a pretext for North Korean invasion.

Threats from the North are both real and present. They have not vanished yet. But threats involving either missile/artillery attacks or provocation through rear-area penetration are not insurmountable.

²North Korea has forward-deployed SA-5 ground-to-air missiles with a range of 250km, FROG-5/7 ground-to-ground free rockets with ranges of 50–70 km, 170mm self-propelled artillery, and 240mm multiple rocket launchers (*Defense White Paper* 1998).

ROK-US combined forces are able to deter any major conventional military attacks from the North. If deterrence fails, they can invade North Korea, demolish its armed forces, and destroy its regime through a swift transition to war. South Korea's improving diplomatic and economic cooperation with China and Russia should mitigate any threats from the regional theater. Japan will not pose any threats so long as security cooperation among Washington, Tokyo, and Seoul remains intact.

The second scenario (II) presupposes three conditions: continuing U.S. engagement; a Korea that is either unified or at peace with North Korea as a result of improved inter-Korean relations, whether through a peace treaty or significant confidence-building and arms control measures; and the advent of hostile regional actors (e.g., China as a regional spoiler, Japan's remilitarization, and/or the revival of Russia's Far East military power). Korea will not encounter the development of this scenario in the immediate future. But in the medium-to-long term, its possibility cannot be entirely ruled out.

In this scenario, China would be the most critical actor. Several factors could turn China into a malignant spoiler threatening regional strategic stability. Overt hegemonic rivalry between Beijing and Washington, an expanded Japanese role in regional defense through the new Japan-U.S. defense guidelines, and revival of a cross-strait crisis and U.S. defense of Taiwan could all drive China toward reactive spoilership. In such an event, Korea, unified or divided, would have to take a position. Korea's alliance with the United States and/or Japan could easily antagonize China, straining Beijing-Seoul relations. Given the relatively long land border with China and Korean ethnic presence in China's northeastern provinces, China and Korea could become military adversaries. Russia's Far East military build-up will not resume soon, and there might not be any immediate sources of military tension between Russia and Korea. Thus, the Russian threat may not have to be taken into account in this scenario. Continuing U.S. engagement in the region would mitigate any overt conflicts between Japan and Korea, but Japan could still pose a potential threat. Two issues could complicate Japan-Korea relations. One is the unresolved dispute over Tokdo Island. The other is the Exclusive Economic Zone and related clashes over marine resources. Either of these could lead to conflict.

Scenario II posits an improved security environment for Korea, not only because threats from North Korea would end but also because of the continuing deterrent role of the United States. Maintenance of the Japan-Korea-U.S. alliance system will also serve to deter Chinese military moves, while preventing any major conflict between Japan and Korea. But this optimistic scenario could be derailed if a multiple threat structure emerges. If Korea still remains divided, for example, North Korea could form a much stronger alliance with China, posing added threats to South Korea. In this case (i.e., combination of scenarios I and II), the situation would get worse, further undermining South Korea's security posture.

The third scenario (III) would unfold if the United States were to disengage from the Korean peninsula amidst military threats from North Korea (Lee, Chun-keun 1998; Seo, Jintai 1998; Cha 1998; Halloran 1999). This scenario also assumes that threats from regional actors remain minimal, owing to South Korea's active diplomacy with China and Russia. Two conditions could make this scenario plausible. The first would be a major breakthrough in inter-Korean relations and establishment of *de facto* unification through an active implementation of the Basic Agreement on Reconciliation, Non-aggression, Cooperation and Exchanges. Reduced military tension on the Korean peninsula would in turn deprive the United States of a rationale for its continuing security commitment, fostering a reduction or withdrawal of U.S. forces from Korea. After U.S. disengagement, North Korea could again become aggressive, returning to its old posture. The second condition that could precipitate U.S. disengagement would be Balkanization of the Korean conflict. Failure to resolve the problems of North Korean weapons of mass destruction and missile systems, for example, could lead to an outbreak of limited but protracted conflict on the Korean peninsula. While such a development would ensure a short-term U.S. engagement, any prolongation involving large numbers of U.S. casualties would aggravate public opinion in the United States, eventually forcing its disengagement.

Threats from the North could be mixed under this scenario. Developments involving inter-Korean confidence building, arms control, and peace building could remove military tensions on the Korean peninsula, and threats from the North could be minimal. But the reverse developments would force South Korea to cope with

North Korean military threats by itself. Overall force assessments that include non-military dimensions reveal that South Korea would be superior to the North. But North Korea's quantitative advantage and the offensive nature of its military capabilities would undercut the South's overall superiority. The devastation ensuing from protracted military conflict would make both the North and the South ultimate losers.

The fourth scenario (IV) resembles late 19th century East Asia, when finite deterrence based on overlapping dyadic animosities and domination and subjugation prevailed (Kim and Moon 1997; Kim, Ki-Jung 1998). In this scenario, Korean unification could trigger U.S. disengagement from the Korean peninsula. Such a development would instantly lead to Japan's remilitarization through amendment of Article 9 of its Constitution. The transformation of Japan into a "normal" state with full-fledged regular armed forces could precipitate a fierce arms race with China. Indeed, such an arms race would be unavoidable—not simply because of past historical memories but also because of the overall power transition and hegemonic ambitions in the region. While Japan has already amassed the potential for its regional dominance, it is simply a matter of time for China to leapfrog into a hegemonic position in view of its economic size and tempo of technological development. A competition for hegemony between the two regional giants could also entangle Russia in the regional security equation.

The ideal way to prevent such a scenario from materializing would be to form a multilateral security cooperation regime in the region that can ensure transparency and crisis stability through intra-regional confidence-building measures. But if this does not work, a unified Korea, as a middle power, would have three options. One would be to take sides with the continental power, China, and deter Japanese military moves. Another would be to take sides with the maritime power, Japan, and counter Chinese expansion. The third would be for Korea to try to play the role of balancer. To perform as an effective balancer, Korea should satisfy one of the following two conditions: it must have a credible military capability to sustain its self-defense; or it must realign its international and regional status by declaring permanent neutrality. None of these options, however, would exempt Korea from regional threats. Indeed, the security environment postulated under the fourth scenario would be a nightmare

for a unified Korea. The combination of a divided Korea, American disengagement, and regional strategic instability would be even worse. In this event, South Korea would have to counter two sets of threats: one from the North and the other from regional powers.

Examination of these four plausible scenarios for the future regional security environment demonstrates that the advent of the post-Cold War order has neither diluted nor resolved South Korea's security dilemma. On the contrary, South Korea's security environment can deteriorate significantly, depending on the strategic moves by the United States and regional powers. In the short run, it seems likely that the United States will remain engaged in South Korea and the region, and threats to South Korea will be confined largely to North Korea. In the medium and long run, however, South Korea or a unified Korea could encounter a much more precarious and uncertain security environment. It might have to be able to deal with multiple threats from a hegemonic China, remilitarized Japan, and potentially unstable Russian Far East. In addition, unresolved territorial disputes (e.g., Tokdo, Mt. Baikdu), the Exclusive Economic Zones (EEZ), and new disputes over resources, including the continental shelf, and safety over the sea lanes of communication can all become volatile flash points for major conflicts in East Asia.

ASSESSING MILITARY STRATEGIES AND FORCE STRUCTURE

Can South Korea cope with this diverse inter-Korean and regional threat structure? To answer this question, it is essential to look into South Korea's existing military strategies and force structure.

Traditional military strategy in South Korea is composed of three major elements (*Defense White Paper* 1998).³ The first is defensive deterrence through the acquisition of visible combat capability. Since North Korea is seen as the primary source of military threats, deterring its military aggression and, if deterrence fails, winning the

³The Republic of Korea has not declared any official strategic doctrines. But the *Defense White Paper*, which is published annually, presents a general contour of its strategic posture. The National Security Council had a plan to publish an annual president's national strategy report, but it was aborted due to the Taepo Dong II launch by North Korea in 1998.

war has constituted the ultimate objectives of South Korea's military strategy. During the Cold War, Russia and China were also considered additional threats. Since the late 1980s, however, South Korea has normalized diplomatic ties with both countries and no longer regards either as a potential threat. And although Japan is often portrayed as a potential source of threat in the near future, Japanese diplomatic protests have induced South Korea to delete Japan from its list of future threats. In this sense, South Korea's military strategy can be described as being geared toward deterring offensive military moves by North Korea.

The second element is coalition warfare through the bilateral alliance with the United States. Under the ROK-US Mutual Defense Treaty, the two countries have cultivated a strong bilateral alliance, as exemplified by the formation and operation of the ROK-US Combined Forces Command (CFC). As the "trip wire" analogy implies, North Korea's military aggression will automatically activate U.S. involvement. In the event of a major military conflict with the North, the United States will be a direct party in two ways: by exercising command and control of all South Korean forces; and by engaging U.S. combat forces in immediate defense of the ROK. At the same time, reinforcements from U.S. military assets in Japan (the 5th Air Force and the 7th Fleet) and the mainland United States by massive air and sea lift will further strengthen ROK-US combined forces. It is the combined forces of the two countries that will generate credible deterrent and defense capability against North Korea (McLaurin and Moon 1989; Lee, Chun-keun 1998).

The third element of South Korea's traditional military strategy is active or offensive defense (*Defense White Paper* 1998). The concept of offensive defense goes beyond the traditional notion of quick response. If deterrence fails, the combined forces of South Korea and the United States will shift to a wartime footing, seize the initiative, and carry the fight to the enemy territory, terminating the conflict on terms favorable to South Korea. Such a war fighting strategy implies that any failure of deterrence will be linked automatically to winning the war and occupying the North, which can expedite the process of unification. Although U.S. pressures prevent the ROK from adopting a strategic doctrine of preemptive or offensive deterrence during peacetime, South Korea will become much more flexible in maneuvering its strategy during wartime.

South Korean forces have been structured to carry out these three elements of ROK military strategy. The most striking aspect of South Korea's force structure is the primacy of ground forces. At present, ground forces account for more than 90 percent of South Korea's total military manpower. They have also been given top priority in the allocation of resources. During the Yulgok force modernization and improvement program, which was initiated in 1974, more than 50 percent of total investment was poured into the ground forces (Ministry of National Defense 1995:149–151). The lion's share of the Yulgok project has gone to improvement of the operational capability of 40 combat divisions, equipment modernization focusing on armored vehicles and antitank capability, and modernization of artillery fire power and ground-based air defense. Modernization and improvement of air and naval power remained largely secondary to those of ground forces. More important, most commanding posts—including Defense Minister and Chairman of the Joint Chiefs of Staff, as well as the strategic planning posts—have been monopolized by army personnel, furthering the asymmetric development of South Korea's force structure (Suh 1998).

The primacy of ground forces was an unavoidable outcome of conventional threat assessments and strategic planning. As noted above, South Korea has long perceived North Korean threats in terms of all-out ground attacks across the DMZ, as was seen during the Korean War. The North's blitzkrieg strategy has been based primarily on ground forces in which artillery power and tanks constitute the twin pillars of attack forces. Furthermore, 60 percent of North's ground forces is forward deployed below Pyongyang and Wonsan (*Defense White Paper* 1998:38; Lee, Youngho, 1996). Pyongyang's strategic posture and force structure have shaped the primacy of ground forces in South Korea's strategic planning. Along with this, the active or offensive defense doctrine of carrying the war to the enemy's territory and terminating the war on terms favorable to South Korea has offered an additional rationale for the centrality of ground forces. Neither the navy nor air force can carry out the tasks of penetrating and occupying the enemy's territory.

Another salient feature of South Korea's force structure is the strategic and tactical division of labor with the United States in force planning and deployment. The primacy of South Korea's ground forces has led the United States to assume a greater role in air and

naval defense. South Korea's naval and air forces have long been regarded as a supplementary "holding force" to defend the South from the first North Korean attack until U.S. reinforcements (Suh 1997:27–28). According to this formula, the United States is to assume the role of command and control, strategic surveillance, and naval and air defense, while South Korea is to be responsible for ground defense and tactical surveillance (Han 1998; Kim, Haengbok 1998). Such a division of labor has bred an asymmetric force structure in South Korea, impairing modernization and improvement of both naval and air forces.⁴

Finally, South Korea's force structure is framed around conventional forces. Despite serious attempts throughout the 1970s, South Korea was not able to engage in the development of nuclear weapons and their delivery vehicles. It has not deliberated on biochemical weapons either. Thus, conventional forces have constituted the mainstay of South Korea's force structure. Two factors have impeded its venture into strategic weapons. While cost and technology factors have posed major challenges to domestic research and development, U.S. opposition to South Korea's development of strategic weapons has been a larger factor. Washington's stringent nonproliferation policy on weapons of mass destruction and delivery vehicles was the primary stumbling block to an alternative force structure that combines both conventional and strategic weapons.⁵

Can South Korea's strategy and force structure deal with new inter-Korean and regional threats adequately? It is highly unlikely that South Korea can effectively cope with contingencies originating from the four different scenarios described above. The existing strategy and force structure have been shaped under the strategic logic of the Cold War, and, to a great extent, they fail to address the shifting nature of security threats in the post-Cold War era. Whether they can even successfully deter North Korean attacks under Scenario I alone has become increasingly questionable.

⁴Cost factor has also undercut modernization and improvement of naval and air forces. Both naval and air forces involve the acquisition of capital-intensive weapons and equipment.

⁵Former president Park Chung-hee initiated and pushed hard programs on nuclear weapons and missiles. But U.S. pressures aborted his attempt.

An examination of the force structures of, and newly emerging threats from, North Korea and the regional powers underscores the weakness of the existing strategy and force structure. The nature of these threats has undergone a profound transformation. Threats from the North, for example, are no longer limited to conventional ground forces. As Table 5.2 shows, the North has amassed a formidable arsenal of medium- to long-range artillery firepower and ballistic missiles, while slowing down its build-up of conventional ground forces. The launch of the Taepo Dong II missile on August 31, 1998, which alarmed the entire world, highlights the strengthened position of its strategic forces. In addition, North Korea is also known to be capable of building nuclear and biochemical warheads. The North's transition to a nonconventional force structure and its subsequent amplified threats warrant a critical reexamination of South Korea's strategy and force structure. This is because a mix of conventional weapons (e.g., 270mm multiple rocket launchers) and tactical missiles (e.g., SCUD B/C) could threaten more than 75 percent of the South Korean population.

Under Scenarios II and IV, Korea, unified or divided, would be subject to a wide window of vulnerability. China and Japan have signifi-

Table 5.2
A Survey of North Korean Missile Profiles

Name	Max Range (km)	Warhead (kg)	Boost Stage	Length (m)	Diameter (m)	Weight (ton)	IOC
<i>DF-61</i>	600	1,000	1	9.0	1.0	6.0	NA
SCUD B (R-17E)	600	1,000	1	11.164	.884	5.86	1981
SCUD Mod. A	400	1,000	1	11.164	.884	5.86	1984
SCUD B	320–340	1,000	1	11.164	.884	5.86	1987
SCUD C, SCUD PIP	500	700–800	1	11.3	.884		1989
SCUD D, No Dong I	1,000–1,300	700–800	1	15.4	1.2		1997
No Dong II, Scud X,	1,500–2,000	1,000	2				00–05
No Dong III	4,000–6,000	1,000	2	32.0			00–05

SOURCE: www.as.org/nuke/guide/dprk/missile/index.html

cantly upgraded their respective force structures since the mid-1980s, with a focus on naval and air power. China realigned its strategic doctrine from a ground forces-based “people’s war” to limited war, which encouraged the development of a power projection capability and expedited the process of military modernization. As a result, China’s military capability has improved significantly (see Table 5.3). China is building a “blue water” navy framed around carrier battle groups. As part of this effort, it is scheduled to complete a carrier by the year 2000. Air power has drawn even greater attention in its force modernization. It is estimated that China will acquire about 250 Su-27s by the year 2002. Along with this, China plans to operate AWACs starting from 2002, which will employ Israeli-made phased array radar on the Russian-made Il-78 (Noh 1998:242–243). In addition to the strategic surveillance system, China is the third largest nuclear power in the world in terms of warheads and delivery vehicles. Given the pace of its economic and technological development, Beijing is likely to accelerate the modernization and improvement of both its conventional and strategic forces.

As Table 5.4 suggests, Japan has already achieved military superiority in several areas despite its constitutional restrictions (*Defense White Paper* 1998:29). Since 1976, Japan has consistently improved its air power. It now possesses 189 F-15J/DJ air fighters and has completed the production and deployment of the F-2, which is a Japanese ver-

Table 5.3
Chinese Military Capability

Classification	Quantity
Total troops	2,840,000 (Reserve forces: 1,200,000)
Ground forces	Divisions: 107 Tanks: 8,500 Armored vehicles: 5,500 Field artillery: 14,500 Helicopters: 116
Naval forces	Submarines: 61 Surface combatants: 51 Minesweepers: 121 Landing craft: 71 Aircraft: 535 Helicopters: 194
Air forces	Fighters: 3,740 Transport planes: 403 Others: 290
Nuclear forces	ICBMs: 17 IRBMs: 63

SOURCE: MND, *Defense White Paper* (1998), p. 31.

Table 5.4
Japanese Military Capability

Classification	Quantity
Total troops	235,600 (Reserve forces: 46,000)
GSDF ^a	Divisions: 13 Tanks: 1,100 Armored vehicles: 950 Helicopters: 463 Field Artillery: 800
MSDF ^b	Submarines: 16 Surface combatants: 58 Minesweepers: 35 Landing craft: 6 Aircraft: 110 Helicopters: 99
ASDF ^c	Fighters: 368 Transport planes: 42 Others: 182

SOURCE: MND, *Defense White Paper* (1998), p. 29.

^aGround Self-Defense Force.

^bMaritime Self-Defense Force.

^cAir Self-Defense Force.

sion of the F-16 manufactured by Mitsubishi Heavy Industry. The F-2 is known to be a cutting-edge fighter/bomber with such advanced avionics and control systems as fly by wire. On top of these programs, Japan plans to acquire air refueling planes, which can substantially improve its air fighting capability given its extended radius and flying time. The current combat radius of the F-15 is 1,500 km, but once refueling planes become operational, the radius can be extended to 3,000 km, enhancing Japan's power projection capability significantly. Japan has already put four AWACs (E-767) into operation, which can cover a radius of 400 km. Thus, it might not be an exaggeration to say that Japan has already achieved air superiority in the region (Han, Kye-ok 1994:278-279). With the acquisition of AEGIS destroyers, the Japanese navy has also significantly improved its naval surveillance and power projection capability. But what is really worrisome is not simply Japan's current military capability, but its potential power projection capability. Japan has both the financial and technological means to transform its military into powerful strategic forces in a relatively short span of time. Absent a U.S. presence, Japan may well attempt to fill the power vacuum by becoming a major hegemonic contestant in the region.

Since the dissolution of the Soviet Union, Russia's military power in general and combat capabilities in the Far East in particular have eroded considerably. Poor financial support, demoralization of military personnel, and most important, lack of purpose have all con-

tributed to the erosion of Moscow's military capability in the Far East. Furthermore, Russia may not pose any immediate or medium-term threats to South Korea. However, Russia's military potential should not be treated lightly. It is still the second largest nuclear power in the world. Gradual erosion notwithstanding, its military deployment in the Russian Far East is quite formidable, with 762 ICBMs, 25 SSBNs, and 69 strategic bombers. And the total number of forces currently deployed in the area is substantial: manpower figures are over 225,000, 300,000, and 420,000 for naval, air, and ground forces respectively. In the event of major contingencies, Russia can swiftly prepare for combat (*Defense White Paper* 1998:33; Yon 1996).

Similarly, force structures in Northeast Asia are undergoing rapid changes. A noticeable common trend is a movement toward preparation for high-tech wars. The Gulf War appears to have provided a critical impetus for such transformation in which a greater emphasis is now being placed on strategic and nonconventional (nuclear and biochemical) forces. North Korea presents a classic example in this regard. Another striking aspect is renewed attention to air and space power. Aiming higher and longer has become a new motto for defense planning for China, Japan, and Russia (see Table 5.5). Realizing

Table 5.5

Comparative Overview of Air Power and Strategic Arms in Northeast Asia

Troops	Classification	Russia 130,000	China 470,000	Japan 44,100	N. Korea 103,000	S. Korea 63,000
Air Power	Reconnaissance planes	160	290	20	Some	29
	Fighters (type and number of main aircraft)	2,891 (Su-27: 385)	3,448 (Su-27: 40)	368 (F-15: 189)	850 (MiG-29: 30)	550 (F-16: 120)
	Transport planes	300	379	40	some	22
	Tankers	20	—	—	—	—
	Helicopters	824	190	some	290	24
Strategic bombers		O	×	×	×	×
Ballistic missiles		O	O	O	O	×
Nuclear weapons		O	O	potential	potential	×

SOURCE: The Military Balance 1997–1998.

that air superiority cannot be achieved without acquiring reconnaissance/surveillance, control, and strike capability (Fogleman 1999), East Asian countries have been strengthening C4ISR components (Chung 1998:27–41). Unfortunately, existing strategies and force structures are not likely to cope with this new trend in the region. A fundamental realignment seems inevitable (Suh 1998; KIDA 1998).

Equally critical is the potential ambiguity of the U.S. security commitment to South Korea. As long as this commitment remains stable and U.S. troops are stationed in South Korea (Scenarios I and II), strategic stability can be ensured and there will be no need for any extensive force structure realignment. But there is no guarantee of a permanent U.S. security commitment. A gradual reduction and eventual disengagement of U.S. troops might not be avoidable. Several developments could influence such a decision. One would be a major breakthrough in inter-Korean relations and accommodation of North Korean demands, possibly in a North Korea-U.S. peace treaty. Another would be major disasters and heavy casualties of U.S. forces elsewhere, with mounting domestic pressures for the withdrawal of overseas troops including from South Korea. A third would be significant deterioration of public opinion as a result of protracted disputes over “burden sharing” with U.S. allies or of leadership change associated with the rise to political power by the Vietnamese war generation (Halloran 1999). A gradual or sudden realignment of the U.S. security commitment to South Korea would have a range of catastrophic effects on South Korea’s force structure. These include a paralysis of command, control, communication and intelligence systems, a void in strategic surveillance, and ultimately a vacuum in naval and air power (Lee, Chun-keun 1998 and Cha 1998). South Korea might be able to deal with North Korean threats, but it will be virtually impossible to ensure military deterrence against regional powers.

Another critical flaw is that South Korea’s existing strategy and force structure cannot realize its intended political and military objectives. Effective deterrence rests on three elements: the ability of the deterrent power to prevent or resist an attack; sufficient capabilities to exact a cost that outweighs any potential benefits of attacking; and the will to carry out the intentions of deterrence and resist attacks (Robert Jervis 1976). The core of deterrence is credible retaliatory or second-strike capabilities. Neither ground forces nor naval forces

can provide instant second-strike capabilities. Ground forces are useful in resisting initial attacks and occupying the enemy's territory, while naval forces are effective in denying sea penetration, detecting and attacking submarine infiltration, and ensuring safety of sea lanes of communication. The ultimate second-strike capabilities exist in air power, including attack aircraft and missiles (Suh 1998: 39–40).

Based on the above observations, South Korea's existing force structure is defective on three accounts. First, it is not adequately equipped to deal with both present and future threats arising from nonconventional and high-tech war scenarios in the region. Pre-occupation with the Cold War force structure has fundamentally undermined defense preparedness for newly emerging contingencies. Second, structural dependency on U.S. forces in the areas of command, control, communication, intelligence, reconnaissance and surveillance as well as naval and air power could deal a critical blow to South Korea's security posture in the event of an abrupt reduction or withdrawal of U.S. forces. Finally, the current ground force-based structure cannot ensure effective deterrence because it lacks a credible second-strike capability.

REFLECTIONS ON ALTERNATIVE STRATEGIES AND FORCE STRUCTURE

This chapter has argued that South Korea's existing strategy and force structure are not appropriate in preparing for future contingencies. What would then be a desirable strategy and force structure? Strategic choices and force structures are contingent upon perceptions of the security environment and patterns of future war scenarios. Thus, it is inconceivable to devise a single strategy and force structure. Table 5.6 presents four possible alternatives, one for each scenario.

The alternative strategy suggested for Scenario I dovetails with the current one, both because operational command and control during wartime rests with the United States and because it will be difficult for South Korea to adopt new strategic doctrines—such as offensive deterrence—in opposition to U.S. preferences. Coalition warfare

Table 5.6
Alternative Strategies by Scenario

	North Korean Threats	Regional Threats
U.S. engagement	I defensive deterrence/ coalition warfare/ offensive defense	II defensive deterrence/ limited coalition warfare/ strategic denial and second-strike capability
U.S. disengagement	III military self-help/ offensive deterrence/ retaliatory capability	IV military self-help/ strategic denial/ credible deterrence/ middle power and balancer

through US-ROK combined forces will also constitute another pronounced element of the strategy, with the 7th Air Force playing a pivotal role in ensuring defensive deterrence through its strategic surveillance and air fighting capabilities (72 F-16s, 18 A-10/OA-10 air-to-surface attack fighters, and one squadron of F-15E) (Feb. 13, 1998, *Chosun Ilbo*). Sequential offensive defense, which is designed to carry the fighting into North Korean territory and destroy and occupy the North if deterrence fails, should also be retained. But the alternative strategy advocates a more assertive strategic posture by not only going beyond a simple quick response, but also ensuring a viable deterrence through credible retaliatory capability.

Scenario II assumes a situation in which limited conflicts over territorial or resource issues could occur with regional powers. The posture of defensive deterrence should be maintained under this scenario, but the complicated nature of potential conflicts will diminish chances for coalition warfare with the United States. Even if U.S. troops are stationed on the Korean peninsula, the United States will be more likely to facilitate conflict resolution than to side with South Korea over other regional actors. Thus, a greater degree of military self-help needs to be incorporated into the new strategic posture. Moreover, since regional powers possess strategic capabilities, Korea, unified or divided, should consider adopting a doctrine of strategic denial, which can preempt potential enemies' moves. An improved second-strike capability also seems essential.

Scenario III posits a situation in which U.S. forces in the South are either substantially reduced or withdrawn, while the North Korean threats remain. In this scenario, military self-help should replace coalition warfare. The transfer of command and control to South Korean authorities during both peacetime and wartime will make South Korea more flexible in realigning its strategic doctrine. As a way of demonstrating its intentions, capability, and will, South Korea could adopt offensive, rather than defensive, deterrence through forward deployment of military forces and acquisition of powerful retaliatory assets (McLaurin and Moon 1989).

Scenario IV would place Korea, unified or divided, under the most difficult security situation. While American troops are being withdrawn, Korea has to cope with potential military conflicts with three major regional powers. Given the asymmetry of military power, Korea needs to avoid offensive deterrence or power projection capability. Credible defensive deterrence through military self-help must be a logical step. Especially, a strategic denial capability should constitute an integral part of the defensive deterrence strategy. A powerful second-strike capability with deep penetration into the enemy's territory should be combined with strategic denial in order to make defensive deterrence effective. The proposed strategy to cope with Scenario IV, therefore, presupposes a considerable military build-up on the part of Korea. But the size, strategic capability, and upgrading of regional powers' force structures will fundamentally limit the scope of military maneuverability by Korea. For that reason, effective alliance management through prudent diplomacy, be it a maritime, continental, or balancer form, should be incorporated into the new military strategy.

What kinds of force structures are desirable in carrying out these diverse strategies? Defense planners should pay attention to three common denominators in making decisions on South Korea's future force structure. First is the centrality of air power. No matter how much they are improved, ground forces cannot serve as an effective deterrent or second-strike power. Strategic denial is also beyond its purview—particularly in the case of regional powers. Naval forces can be a reliable support element in facilitating counter-penetration and strategic denial. Expansion of the navy into a blue water navy with the acquisition of carrier battle groups could be a credible strategic alternative. But it is less viable not only because of the cost

factor but also because of its power projection implications, which entail instantly antagonistic reactions from regional powers. The only remaining option is the modernization and improvement of air power. It may not be an exaggeration to say that the future of Korean security depends on air power since it can offer the most credible deterrence, strategic denial, and second-strike capability without necessarily posing an offensive or power projection posture (Suh 1998; Hallion 1997; Fogleman 1999; Moon and Lee 1999).

A critical issue here is how to enhance air power. Needless to say, fighter planes are the mainstay of air power, since air superiority is ultimately determined by their qualitative nature. A debate is currently taking place in South Korea over the choice of next generation fighters. While the Ministry of Industry and Resources, the aerospace industry, the Ministry of Finance and Economy, and even the Ministry of National Defense favor the continuation of the F-16 for budgetary and industrial policy reasons,⁶ the ROK Air Force has called for foreign acquisition of next generation fighters such as F-15E, EF-2000, Su-35, and Rafael (May 12, 1999, *News Plus*:36). There are several qualitative differences between the two. After fierce bureaucratic battles, both parties reached a compromise in which production of a limited number of F-16s and foreign acquisition of next generation fighters are to be simultaneously pursued without undercutting air force budgets. The decision could strengthen not only the air power component of South Korea's future force structure but also the aerospace industry. This is a positive development.

A second important requirement for future force planning is the enhancement of South Korea's antiballistic missile capability. As noted above, both North Korean and regional threats have increasingly gravitated toward conventional and ballistic missiles. For example, North Korea's FROG-7s (70km range) alone can hit 55 percent of the South Korean populace. If SCUD-Bs (300km range) are added, 75 percent of South Korea's population falls into its target range (Kim

⁶Samsung Aerospace, Daewoo Heavy Machinery, and Hyundai Aerospace have formed a consortium to undertake the production of F-16 under the Korea Fighters Program (KFP). But KFP is scheduled to be terminated in 1999 as ROK Air Force favors FX. This could deal a critical blow to the aerospace industry with underutilization of production capacity. It is this industrial policy consideration that was instrumental for reviving KFP. But budget appropriation for both programs could be problematic.

Chang-hyun 1996:142–143). North Korea can pose serious threats to the South even without going into nuclear weapons. China and Russia also possess a full range of strategic, tactical, and conventional missiles. South Korea is not prepared to cope with such threats. Although U.S. forces in South Korea have deployed an advanced version of the Patriot PAC-2 antimissile system, this is for its own defense, not for the defense of South Korea.

As the Gulf War experiences reveal, intercepting incoming missiles through *Patriot PAC-2* or other antimissile systems could be extremely difficult. But acquisition of such systems could also serve as a credible deterrent force. In a similar vein, South Korea might have to rethink participating in the Theater Missile Defense (TMD) project. Since TMD involves defensive, not offensive, maneuvers, it may not invite the strong opposition from China and North Korea that government officials currently anticipate. More important, participation in the TMD project itself can offer South Korea additional bargaining leverage in dealing with the North and reducing its missile threats. Joining the TMD venture could be very expensive, and South Korea has not yet escaped from the trauma of economic crisis. Thus, the cost factor should be taken into account. But there could be several niches in which South Korea could still participate with minimum costs.

A caveat is in order, however. Antimissile systems are good for preventive and defensive deterrence, but they do not provide a second-strike capability, which South Korea could desperately need. U.S. pressure virtually demolished missile development programs during the Chun Doo-Hwan government. But the launch of the Taepo Dong II missile by North Korea in 1998 is reviving policymakers' interest in missile sovereignty, fostering new negotiations with the United States on the development of longer-range missiles as well as a greater research and development investment in this area. Development of long range (e.g., over 1,000 km) missiles could antagonize China, Japan, and even Russia, but developing medium-range (e.g., 500–1,000 km) missiles could enhance South Korea's national security interests by allowing it to have a credible strategic denial and second-strike capability.

Finally, it seems essential for South Korea to prepare for building early warning and both tactical and strategic surveillance systems. At

present, South Korea depends heavily on the United States for tactical and strategic intelligence. If the United States expedites its disengagement from the Korean peninsula, however, South Korea could find itself confronted with an intelligence, reconnaissance, and surveillance blackout. Such developments would severely jeopardize South Korea's security posture, particularly because of changing concepts of future battle. In light of the global information revolution, control, communication, and information assets will determine the ultimate outcomes of future wars. Japan, China, and Russia have been moving into the strengthening of C4ISR capabilities. Because of the short technological cycle in the areas of information and communication, it might be too late to develop such capabilities after the United States has disengaged from the Korean peninsula. Therefore, South Korea's force structure needs to be realigned in the direction of strengthening C4ISR. In this regard, acquisition of AWACs, which was suspended due to the economic crisis and emphasis on fiscal austerity, needs to be reactivated. At the same time, more active investments in C4ISR should be undertaken. The current effort by defense planners in South Korea to reinvent the Korean military by moving into cutting-edge technology forces that can fully utilize the information revolution is very welcome.

CONCLUSION

The advent of the post-Cold War era has not brought peace and security to South Korea. But it has been something like opening Pandora's box. The lifting of the Cold War overlay has brought back to the surface the specter of finite deterrence in the region, which was shaped through the historical dynamics of domination, subjugation, and suspicion but repressed throughout the period of Cold War bipolarity (Kim and Moon 1997). South Koreans feel the burden of the historical irony more strongly than anyone else. The expanded scope of peninsular and regional threats, qualitative changes in threats from conventional to nonconventional and strategic, and growing uncertainties over continuing U.S. engagement on the Korean peninsula are likely to haunt South Korea, compelling a fundamental rethinking of its strategy, force structure, and defense planning. Continued preoccupation with the traditional elements of defensive deterrence, coalition warfare through an alliance with the United States, and active defense might not be suited for ensuring

peace and security on the Korean peninsula. This preoccupation is more suitable for the Cold War setting than for post-Cold War strategic instabilities. The traditional force structure, which combines the primacy of ground forces with American support and conventional forces, is also inadequate to meet South Korea's strategic objectives in the new era.

For these reasons, a radical paradigm shift in strategic and force planning is needed. Military strategy needs to be more future-oriented than inertia-driven. It also has to be more flexible than rigid. Accurate forecasting of future war scenarios and sound threat assessments, not bureaucratic interests and political gridlock, should guide strategic planning and force restructuring. The lessons of recent wars also indicate that force restructuring should be more extensive than incremental in order to secure timely and effective combat capability corresponding to changing battle concepts. Air power should draw utmost attention in this restructuring, since it is through air power that credible preventive deterrence, strategic denial, and second-strike capability can be assured (Cordesman and Wagner 1990; Fogleman 1999). Along with this emphasis, renewed efforts to strengthen antimissile systems and related retaliatory capability—as well as to prepare for upgrading surveillance and reconnaissance capability—are required. Moving into the new force structure could be an expensive enterprise. But in the age of high-tech wars, preparing for war and securing peace necessarily is expensive. After all, national security does not have a price tag. Finally, defense planning should be guided by worst-case contingencies, not by wishful thinking. In the arena of national security, prudent pessimism is always better than unguarded optimism.

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THE ROLE OF AIR POWER GOING INTO THE 21ST CENTURY

Benjamin S. Lambeth¹

INTRODUCTION

Air power took a quantum leap in credibility and perceived importance after the opening days of Operation Desert Storm in 1991. The convergence of high technology with intensive training and determined strategy that was attested by the allied coalition's successful air campaign against Saddam Hussein's Iraq bespoke a breakthrough in the strategic effectiveness of the air weapon after a promising start in World War II and more than three years of misuse in the Rolling Thunder bombing campaign against North Vietnam from 1965 to 1968. Indeed, the speedy attainment of allied air control over Iraq and what that allowed allied air and space assets to accomplish afterwards by way of enabling the prompt achievement of the coalition's military objectives on the ground marked, in the view of many, the final coming of age of air power.

There was no denying the effect that initial air operations had in shaping the subsequent course of the war. The opening coalition attacks against Iraq's command and control facilities and integrated air defenses proved uniformly successful, with some 800 combat sorties

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launched in the blackness of night in radio silence against Iraq's most militarily critical targets and only one coalition aircraft lost—a U.S. Navy F/A-18, presumably to a lucky infrared missile shot from an Iraqi MiG-25. Over the next three days, the air campaign struck at the entire spectrum of Iraq's strategic and operational-level assets, gaining unchallenged control of the air and the freedom to operate with impunity against Iraq's airfields, fielded ground forces, and other targets of military interest.

In the aftermath of the war, the predominant tendency, not just among airmen, was to credit coalition air power with the bulk of responsibility for having produced such a lopsided win. Senator Sam Nunn, initially a doubter about the wisdom of the Bush Administration's going to war for the liberation of Kuwait, hailed the result as attesting to the advent of a "new era of warfare."² Three years later, Eliot Cohen of the Johns Hopkins University's School of Advanced International Studies observed that "although ground action necessarily consummated the final victory for coalition forces, air power had made the final assault as effortless as a wartime operation can be."³ Cohen, who earlier had led the U.S. Air Force's Gulf War Air Power Survey, went on to note that air power had all but taken on a mystique in the public mind as a result of its success in the Persian Gulf.

Since then, a high-stakes controversy has emerged in major capitals around the world centering on how best to apportion operational roles and budget shares among the services at a time of uncertain challenges and near-unprecedented fiscal constraints. Naturally, given the predominant role played by the allied air campaign in Desert Storm and the far-reaching claims made on behalf of air power as a result of its performance, the roles and resources controversy has gravitated toward air power as the principal lightning rod for debate. At its core, this debate has come to concern the extent to which the developed nations can now rely on air-delivered precision

²Patrick E. Tyler, "U.S. Says Early Air Attack Caught Iraq Off Guard," *New York Times*, January 18, 1991.

³Eliot Cohen, "The Mystique of U.S. Air Power," *Foreign Affairs*, January/February 1994, p. 111.

standoff attack weapons in lieu of ground forces to achieve battle-field objectives and minimize the incidence of friendly casualties.

Against that background, this chapter seeks to offer a perspective on the nature and meaning of the qualitative improvements that have taken place in air power since the mid-1980s, with a view toward offering a measured portrait of air power's newly acquired strengths and continued limitations. The chapter concentrates on air power's capability in the context of large-scale theater war, as opposed to smaller-scale operations or irregular conflicts, such as urban combat, that may not involve organized or mechanized forces on the enemy side.⁴ Its goal is to provide a basis for better understanding what has increasingly become a central issue in defense planning, namely, the implications of recent and impending improvements in capabilities to acquire, process, and transmit information about an enemy's forces and to attack those forces with precision air-delivered weapons.

Three bounding rules need stipulating at the outset to clarify what is meant here by air power, which is really a shorthand way of saying air and space power. First, air power does not refer merely to combat aircraft (the glamorous "shooters" that performed so unexpectedly well in Desert Storm) or to the combined hardware assets of an air arm, even though these may seem at times to be the predominant images of it held by both laymen and professionals alike. Rather, in its totality, air power is a complex amalgam of hardware equities and less tangible but equally important ingredients bearing on its effectiveness, such as employment doctrine, concepts of operations, training, tactics, proficiency, leadership, adaptability, and practical experience. These and related "soft" factors vary enormously among air arms around the world operating superficially similar kinds, and often even identical types, of equipment. Yet more often than not, they are given little heed in what typically passes for "air capability" analysis. Only through their combined effects, however, can one ultimately determine the extent to which raw hardware will succeed in producing desired combat results.

⁴For a treatment of air power's role in the latter instances, see Alan Vick, David T. Orlitsky, Abraham Shulsky, and John Stillion, *Preparing the U.S. Air Force for Military Operations Other Than War*, Santa Monica, California, RAND, MR-842-AF, 1997.

Second, air power is functionally inseparable from battlespace information and intelligence. Thanks to the dramatic growth in the lethality and combat effectiveness of air power since the late 1980s, it has become both correct and fashionable to speak increasingly not of numbers of sorties per target killed, but rather of number of kills per combat sortie. Yet air power involves more than merely attacking and destroying enemy targets. It also involves knowing what to hit and where to find it. It is now almost a cliché that air power can kill anything it can see, identify, and engage. It is less widely appreciated that it can kill *only* what it can see, identify, and engage. Air power and intelligence are thus opposite sides of the same coin. If the latter fails, the former is likely to fail also. For that reason, accurate, timely, and comprehensive information about an enemy and his military assets is not only a crucial enabler for allowing air power to produce pivotal results in joint warfare; it is an indispensable precondition for ensuring such results. This means that tomorrow's air campaign planners will have an ever more powerful need for accurate and reliable real-time intelligence as a precondition for making good on their most far-reaching promises.

Third, air power, properly understood, knows no color of uniform. It embraces not only Air Force aircraft, munitions, sensors, and other capabilities, but also naval aviation and the attack helicopters and battlefield missiles of land forces. In this regard, it is worth highlighting that the first allied weapon impact in Operation Desert Storm was not a laser-guided bomb delivered by an F-117 stealth fighter, but a Hellfire missile launched against an Iraqi forward air defense warning site by a U.S. Army AH-64 Apache attack helicopter. As was well borne out by that example, air power entails a creative harnessing of *all* combat and combat support elements, including space and information warfare adjuncts, that exploit the medium of air and space to visit fire and steel on enemy targets. Recognition and acceptance of the fact that air warfare is an activity in which all services have important roles to play is a necessary first step toward a proper understanding and assimilation of air power's changing role in joint warfare.

No attempt will be made in this chapter to explore *all* components of air power, such as mobility and air involvement in military operations other than war. Instead, the emphasis will be on air power's ability to deliver effective fires in joint warfare against organized and

mechanized enemy forces, since it is what *that* ability now offers theater commanders by way of overall combat leverage compared to land forces that involves the highest stakes and has provoked the greatest controversy in defense debates worldwide. One cannot draw overarching conclusions about air power that apply uniformly for all occasions; moreover, its contribution to joint operations can, in fact, range from decisive to irrelevant depending on the particular circumstances facing a theater commander. Nevertheless, the chapter will argue that current and emerging conventional air employment options can now achieve strategic effects in major theater wars directly by offering joint force commanders the promise of engaging and destroying or neutralizing enemy ground forces from standoff ranges with virtual impunity. This reduces threats to friendly troops who might otherwise have to engage undegraded enemy ground forces directly and thus risk sustaining high casualties. That transformation in combat capability is the essence of air power's recent coming of age.

THE LEGACY OF DESERT STORM

Viewed with the broadened perspective that naturally comes with the passage of time, the conduct of the 1991 Persian Gulf war has now come to be seen by most observers as having been considerably less than a towering strategy success. Many of the loftier goals articulated by its leaders before the war, from General Colin Powell's bold assertion with respect to the Iraqi army that "first we're going to cut it off, and then we're going to kill it" to CENTCOM's declared objective of destroying Iraq's capability for manufacturing weapons of mass destruction, did not come to pass. Beyond that, a legitimate and still-active debate has arisen over the perspicacity of the decision to terminate the ground war so abruptly at the 100-hr mark, at just the moment when allied air and ground operations were beginning to make the most of what military professionals call the exploitation phase of war. Analysts will no doubt argue for years to come over what difference it might have made with respect to the longer-term outcome had the coalition kept pressing the combined air and ground offensive for even another 24 to 48 hours.

Yet as a more narrow exercise in the application of air power, Operation Desert Storm was anything but inconclusive. On the con-

trary, the ability of allied air assets to establish air dominance so quickly over a well-endowed opponent who knew a fight was coming and then to draw down his army to a point where coalition ground forces could consummate a virtually bloodless win in a mere 100-hr campaign represented an achievement that is guaranteed to keep Desert Storm prominently listed in the roster of air power success stories. Indeed, its success in keeping allied ground force casualties so remarkably low suggests that the time may have come for considering a fundamentally new approach to the relationship between air- and surface-delivered fires in modern warfare now made possible by the combination of real-time surveillance and precision attack capability that was exercised to such telling effect by air power against Iraqi ground forces. One aspect of this transformation concerns what the resulting synergy does to enable the defeat of an enemy army through *functional* effects rather than through a more classic drawdown in detail by way of attrition. Just as the earlier SEAD campaign was able to neutralize Iraqi radar-guided SAMs not by physically destroying them but by intimidating their operators from turning on their radars, so the precision attacks made possible by Joint STARS and other systems put potentially hostile armies on notice that they can no longer expect a night sanctuary or any place to hide. At the same time, they served notice that any attempt to move will equally ensure a swift and lethal attack.

Interestingly, some of the most insightful comments on the heightened importance of air power in joint warfare made possible by new technologies and concepts of operations have come from Russian defense professionals, who were close observers of Desert Storm because of their role as the main supplier of Iraq's military equipment and doctrine. One of the best characterizations anywhere was put forward not long after the war ended by retired Russian Army Major General I. Vorobyev: "For the first time in history, we observed a case in which a very large grouping of ground troops (more than a million men) suddenly found itself unable to do its business." Vorobyev added that Desert Storm underscored "the decisive role of firepower"—he may as well have said air power—in destroying the enemy. This has never been demonstrated so clearly in any operation in the past. The fire phase became a prolonged strike, as a result of

which Iraq's defenses were so shattered that there was no need to execute an assault to break through fortified positions."⁵

A similar perspective was offered by Soviet army Major General Vladimir Slipchenko, a since-retired professor of strategy at the General Staff Academy. Shortly after the war ended, Slipchenko said: "The Gulf war supports the fact that air strikes can, by themselves, form the basis for victory [notice, not victory but the *basis* for victory]. In Operation Desert Storm, air power was responsible for victory because air superiority altered the complexion of the war from the very outset."⁶ Amplifying on this point, Colonel General Anatoly Malyukov, chief of the Russian Air Force's headquarters staff, hit the nail on the head when he remarked: "There was no classical AirLand Battle in Desert Storm. Why? The point is that this war . . . was obviously conceived from the outset as an air war to wear out the opponent by means of air strikes, disorganize his command systems, destroy his air defenses, and weaken the ground forces' striking power. And these objectives were achieved. Broadly speaking, this is the first time we have seen a war in which aviation took care almost entirely of all the main tasks."⁷

There has been a continuing push from some quarters to make technology the hero of Desert Storm and to conclude that it was technological magic that accounted for such a lopsided win by the coalition. Yet that conclusion almost surely is going to prove to be hollow once the historians have the final word. True enough, the coalition's pronounced technological edge over Iraq made an important difference in shaping the course and outcome of the war, and a few allied "silver bullets" had an impact far disproportionate to their numbers in ensuring the relative effortlessness of Desert Storm. These included the F-117, the HARM missile, the APR-47 threat sensor aboard the F-4G, laser-guided bombs, and Joint STARS, among other platforms, munitions, and systems. Without them, the war would have proven far more costly for the allies.

⁵Major General I. Vorobyev, "Are Tactics Disappearing?" *Krasnaia zvezda*, August 14, 1991.

⁶Major General Vladimir Slipchenko, "What Will There Be Without Icons?" *Voenno-istoricheskii zhurnal*, No. 6, 1991, p. 70.

⁷Interview with Lieutenant General A. Malyukov, "The Gulf War: Initial Conclusions—Air Power Predetermined the Outcome," *Krasnaia zvezda*, March 14, 1991.

However, this observation requires an important qualification. Two points expressed by the late U.S. Secretary of Defense Les Aspin while he was still chairman of the House Armed Services Committee warrant special mention in this regard: "One, the equipment worked and was vindicated against its critics. Two, we know how to orchestrate its use in a way that makes the sum bigger than all the parts."⁸ The second point in Aspin's statement was no less important than the first. Although by all accounts, the F-117 was indispensable in achieving tactical surprise and minimizing the coalition's losses to enemy ground fire, to cite only one case in point, the real force-multiplication leverage that swung the final outcome in Desert Storm came from the way the coalition's diverse assets were brought together in synergistic combination by allied planners.

To sum up, high technology was a significant but not determining factor in the coalition's success in Desert Storm. Superior training, motivation, proficiency, leadership, tactical cleverness, and boldness in execution were no less important in producing the final outcome. One need only consider the immensely difficult balancing act of getting 400 coalition fighters airborne and marshaled at night in radio silence, refueled often several times, and working under tight timelines without a missed tanker connection, let alone a midair collision or other catastrophic accident, to appreciate how aircrew skill and the ability to adapt under stress were critically important to the air campaign's outcome. Without these and other intangibles, all the technology in the world would have been for naught.

THE CHANGED ESSENCE OF AIR POWER

As the relatively swift success of Operation Desert Storm amply bore out, the decade preceding it saw a wide-ranging growth in the efficacy and lethality of the air weapon. Those improvements, mostly evolutionary but some entailing true breakthroughs in performance, accounted for much of the seeming ease of the allied joint force victory against Iraq. The effective role played by air power stemmed from a combination of technology advance, increased intensity and

⁸Representative Les Aspin, "Desert One to Desert Storm: Making Ready for Victory," address to the Center for Strategic and International Studies, Washington, D.C., June 20, 1991, p. 5.

realism of training, and a steadily mounting leadership focus on the operational level of war.

As a result of these three developments, air power has now arrived at a point where it has become truly strategic in its potential effects. That was not the case before the advent of stealth, highly accurate target engagement capability, and substantially improved battlefield information availability. Earlier air campaigns were of limited effectiveness at the operational and strategic levels because it simply took too many aircraft and too high a loss rate to achieve too few results. Today, in contrast, air power can make its presence felt quickly and can impose effects on an enemy from the outset of combat that can have a governing influence on the subsequent course and outcome of a joint campaign.

To begin with, there is no longer a need to amass force as there was even in the recent past. Such advances as low observability to enemy radars and the ability to destroy or neutralize both fixed and moving targets with a single munition have obviated the need for the sort of cumbersome formations of strike and support aircraft that were typically required in Vietnam. The large force packages that the U.S. Air Force and U.S. Navy routinely employed during the air war over North Vietnam offered the only way of ensuring that enough aircraft would make it to their assigned targets to deliver the number of bombs needed to achieve the desired result. Today, improved battlespace awareness, heightened aircraft survivability, and increased weapons accuracy have made possible the *effects* of massing without having to mass. Thanks to this, air power can now produce effects that were previously unattainable. The only question remaining, unlike in earlier eras of strategic bombing, is *when*, not whether, those effects will be registered.

Indeed, the ability to achieve the effects of mass without having to mass is a big part of the essence of air power's new leverage. This means that the day of the classic "gorilla" force package of strike and supporting aircraft has now largely passed, at least in those phases of a conflict following the initial neutralization of an enemy's integrated air defenses. Now that accuracy improvements have opened up the possibility, at least in principle, that nearly every weapon release can be mission-effective, knowing how and where best to commit air power can reduce the number of needed sorties for a given task.

In light of this confluence of developments, retired RAF Air Vice Marshal Tony Mason has proposed that air power may yet succeed in meeting the goal of its early visionaries and obviate altogether any need for surface engagements in many circumstances. However, Mason suggests that a more seemly goal of air power modernization should be to produce situations “which can subsequently be exploited by ground forces in greatly reduced numbers, with greatly reduced casualties, and greatly reduced costs.”⁹ By building on the results gained by surprise and producing the sort of paralysis by intimidation that was inflicted on Iraq’s IADS and army units by the allied air campaign in Desert Storm, air power can neutralize an opponent’s ability to pursue his objectives by means of force or reduce it to a point where the opponent cannot resist a counteroffensive by friendly surface forces. Already, this newly-acquired leverage of air power has unburdened ground commanders of any need to undertake a frontal assault in direct contact with enemy forces until the costs of such an assault can be made tolerable.

To note an important qualification here, air power has by no means become a universally applicable tool providing an answer to every conceivable security challenge that might arise. On the contrary, the spectrum of possible circumstances that could test a joint force commander is so diverse that one can never say for sure that any single force element will always dominate across the board. As one U.S. Army officer observed in this respect not long after Desert Storm, the wide array of possible future contingencies suggests that “no one can safely predict which of the services will be the centerpiece of the next conflict.” That, he went on to say, pointed toward the need for “a balanced force and robust unified commands, fully capable of tailoring and employing the forces needed.”¹⁰

Air Vice Marshal Mason has graphically demonstrated this point via the device of a notional air power pendulum which swings from the clear-cut case of Desert Storm, where targets were accessible and

⁹Air Vice Marshal Tony Mason, RAF (Ret.), “The Future of Air Power,” address to the Royal Netherlands Air Force, Netherlands Defense College, April 19, 1996, p. 4.

¹⁰Lieutenant Colonel Joseph J. Collins, USA, “Desert Storm and the Lessons of Learning,” *Parameters*, Autumn 1992, pp. 87–88.

significant, the desert topography open and unrestricted, the weather generally favorable, bases readily available, and political support both at home and abroad, unquestioned to the more challenging Bosnian scenario, in which targets were mobile and generally of low value, the topography wooded and mountainous, the weather often forbidding, and political support far more fragile. As for other cases of air power application, Mason found the Six Day War of 1967, the Yom Kippur War of 1973, and the Beka'a Valley operation of 1982 far closer to the Desert Storm model in terms of air power's effectiveness and dominance, whereas Somalia and other recent peace-keeping operations aggregated much closer to the Bosnian case.¹¹ In the latter instances, air power proved of more limited value in dealing with the course of events on the ground, even though Operation Deliberate Force did, in the end, help coerce the Bosnian Serbs to put down their arms and accede to a truce.

To note another limiting factor, one must never forget that the operational setting of the 1991 Gulf war was almost uniquely congenial to the effective employment of air power. The going will not always be that easy in future showdowns in which air power might be challenged, as attested by the very different case of Korea. There is where the Gulf war analogy breaks down quickly and where airmen and soldiers have a powerful need for mutual respect because of their mutual dependency. Although air power will almost surely be a key ingredient of success in any war that might erupt there, no such war would be fought with the comparative luxury of fewer than 300 friendly combat fatalities, as was the case in Desert Storm. To begin with, North Korea would presumably be fighting for its survival and might well employ, or attempt to employ, weapons of mass destruction. On top of that, with more than 500,000 armed combatants on both sides poised for immediate action along the demilitarized zone, any such war would necessarily entail close ground combat from the very start.

True enough, air power would quickly establish combined-forces ownership of the skies over North Korea following any outbreak of a full-fledged war on the peninsula. It also would help to reduce the

¹¹Air Vice Marshal Tony Mason, RAF (Ret.), *Air Power: A Centennial Appraisal*, London, Brassey's, 1994, p. xiii.

incidence of friendly combat fatalities by blunting an armored attack, drawing down enemy theater missiles and artillery, and gaining situational control by forcing the enemy to remain underground. It could further engage in systematic "bunker plinking," although many of North Korea's underground facilities are sufficiently secure from air attack that it would require allied ground forces to go in and dig them out. But without question, air power would not be able to halt a North Korean armored and mechanized infantry invasion alone. It would not just beat up on enemy ground troops for forty days as it did in Desert Storm while the other side did nothing. On the contrary, there would be plenty of fight for *all* allied force elements in any such war.

Finally, strategic air attack cannot be expected to break an enemy's will or bring down a political regime. Yet those need no longer be the goals of air power when "strategic attack" can now strike directly at an enemy's instruments of military power and, in effect, deny him the ability to do anything of operational consequence, irrespective of his will. The increased effectiveness of air power against those instruments means that a joint force commander may no longer need to crush an enemy in every case, but merely to disrupt his capacity for collective action in the pursuit of declared goals. There may also be no need in all cases to obliterate a target or target system, but merely to render it ineffective by destroying its ability to function.

With all due acknowledgment of air power's continued limitations, what benefits does the air weapon now offer its ultimate consumer, the joint force commander in chief, whose use for it will be directly proportional to its ability to answer his bottom-line operational needs? The first, and by far most important, payoff of air power's transformation in capability since the mid-1980s entails increasing the situational awareness of friendly forces while denying it to the enemy. Air- and space-based intelligence, surveillance, and reconnaissance (ISR) capabilities now offer greatly improved knowledge of a battlespace situation for all command echelons in a joint operation. They cannot, at least yet, address the legitimate concern voiced by such land combatants as retired U.S. Marine Lieutenant General Paul Van Riper over finding and identifying a notional "enemy company in the basement of [a] built-up area" or "the 12 terrorists mixed

with that crowd in the village market.”¹² However, they are more than adequate for supporting informed and confident force commitment decisions by a joint force commander against large enemy armored formations on the move in the open. For all its continued limitations, such an information advantage entails a major breakthrough in targeting capability and one which, in conjunction with precision attack systems, has made for a uniquely powerful force multiplier.

There is nothing, of course, new about this in and of itself. In a sense, “information warfare” has been practiced by belligerents ever since the days of sticks and stones. The difference today, however, is that commanders and planners are now at the threshold of understanding its importance and mastering it. Indeed, the broad area of sensor fusion is arguably more pivotal than any other single area of technology development, because it is the sine qua non for extracting the fullest value from the new imposition options that are now becoming available. Thanks to the enhanced awareness picture it now promises, this synergistic fusion of information and precision attack capability will strengthen the hands of warfighters up and down the chain of command, from the highest level to individual shooters working within tactical confines.

A second payoff area worth emphasizing is the broadened ability of air power to do things it could not do before, as well as to accomplish more with less for a joint force commander. On the first count, it has shown the ability to maintain air dominance over the heart of an enemy’s territory, enforce no-fly and no-drive zones, and engage enemy armies effectively from relatively safe standoff ranges. On the second count, increased information availability and directability has enabled reduced cycle time, yet another force multiplier which creates a larger apparent force from smaller numbers by permitting a higher operations tempo. Relatedly, the current generation of combat aircraft embodies significant improvements in reliability, maintainability, and sustainability, making possible greater leverage from fewer numbers. Such enhancements now allow both greater

¹²*Clashes of Visions: Sizing and Shaping Our Forces in a Fiscally Constrained Environment*, a CSIS-VII Symposium, October 29, 1997, Washington, D.C., Center for Strategic and International Studies, 1998, p. 38.

concentration of force and a reduction in the amount of time it takes to perform an operational task.

A third major payoff afforded by recent improvements in air power is situation control from the outset of combat, such that the first blow can decide the subsequent course and outcome of a war. Air power now permits the attainment of strategic goals through simultaneity rather than through the classic sequence of methodical plodding from tactical through operational-level to strategic goals at an exorbitant cost in lives, forces, and national treasure. Yet its principal objectives are no longer the familiar ones of leadership, infrastructure, economic potential, and so on invoked by past "strategic bombardment" proponents. Instead, they embrace key assets that make up an enemy's fielded forces and capacity for organized action. Before long, the initial attack may even be surreptitious—for example, into computer systems, to pave the way for fire and steel to follow.

Finally, the maturation of air power has enabled the maintenance of constant pressure on an enemy from a safe distance, increased kills per sortie, selective targeting with near-zero unintended damage, substantially reduced reaction time, and, at least potentially, the complete shutdown of an enemy's ability to control his forces.¹³ These and other payoffs in no way add up to all-purpose substitutes for ground forces. However, they now permit joint force commanders to rely on air power to conduct deep battle for the greater extent of a joint campaign, foreshadowing an end to any need for friendly armies to plan on conducting early close-maneuver combat as a standard practice. As Desert Storm showed, the ability of independently applied air power to own the air and shape the battlefield eliminated any urgent need for the coalition's commanders to commit allied ground troops to battle. The only factor driving a need to wrap things up quickly was the certainty of approaching summer heat, which would have made operations for *all* forces much more difficult.

¹³For further development of these points, see Lieutenant General George K. Muellner, USAF, "Technologies for Air Power in the 21st Century," paper presented at a conference on "Air Power and Space—Future Perspectives" sponsored by the Royal Air Force, London, England, September 12–13, 1996.

In previous years, the dialectic between maneuver and fire cast indirect firepower—whether from air or ground weapons—mostly in a supporting role because it could offer the ground commander little more. That, however, has changed dramatically over the past decade and continues to do so to the benefit of air warfare capabilities. As Barry Watts of Northrop Grumman Corporation has observed, “foreseeable improvements in wide-area surveillance, the ability to act upon the information provided by such surveillance in seconds or minutes, and the range and lethality of indirect, precision fires raise the possibility of air-land combat becoming increasingly dominated by them. Indeed, increased dominance of outcomes by indirect fires from the air was precisely the hallmark of the Desert Storm air campaign, although airmen seldom formulated the point this way.”¹⁴

Relatedly, RAND’s David Ochmanek has noted how in traditional combined-arms thinking, the “indirect” fire provided by air power to ground commanders was valued principally as a means to prevent enemy forces from maneuvering and to induce shock on a battlefield, upon which only close, or “direct,” fire of the sort provided by armored and infantry forces was deemed accurate enough to defeat enemy ground troops decisively. Today, in contrast, technology advance has enabled fielded air and space systems to locate and identify enemy ground units from great distances with high confidence and to bring them under direct fire from standoff ranges with levels of lethality approaching or exceeding those of earlier close-fire systems. The effect, Ochmanek argues, has been to change every aspect of the direct fire mission, “mostly to the detriment of the tank.” Now that air and space power can identify and engage enemy troops from long range, he concludes, the need for friendly ground forces to maneuver and fight at close range has been greatly diminished, “at least under some conditions. The advantage is that battles, campaigns, and wars may be fought more quickly and with far less risk of casualties.”¹⁵

¹⁴Barry D. Watts, “Ignoring Reality: Problems of Theory and Evidence in Security Studies,” *Security Studies*, Winter 1997/98, p. 166.

¹⁵David Ochmanek, “Time to Restructure U.S. Defense Forces,” *Issues in Science and Technology*, Winter 1996–97, pp. 39–40.

All in all, possibly the single greatest effect of the maturation of air power has been its demonstrated capacity to save lives—enemy lives through the use of precision to minimize noncombatant fatalities, and friendly lives by the substitution of technology for manpower and the creation of battlefield conditions in which land elements, once unleashed, can do their jobs without significant resistance because of the degraded capabilities of enemy forces. No less important, modern technology skillfully applied in conjunction with a clear concept of operations offers today's air and space forces a means of gaining their goals through cleverness rather than brute force, in a manner reminiscent of top-scoring Luftwaffe ace Eric Hartmann's frequent injunction that the good combat pilot flies with his head, not his muscles.

A STRUGGLE BETWEEN NEW AND OLD

If air power has registered such gains in capability over the past decade compared to what it was able to contribute to joint warfare in earlier years, then why has it become so beleaguered in today's defense debate? In shedding light on this question, it may be helpful to approach the ongoing confrontation between air and surface warfare functions as the first stirrings of a nascent paradigm shift in defense planning. In essence, a paradigm is a recognized and accepted frame of reference which, in the portrayal of science historian Thomas Kuhn, "for a time provides model problems and solutions to a community of practitioners."¹⁶ Kuhn was speaking of revolutionary changes in scientific outlooks, such as that perhaps most famously exemplified by the gradual transition from the concept of an earth-centered cosmos to that of a solar-centered milieu. Yet the intellectual and professional dynamics that he identified in that process describe almost perfectly what has been happening in the relationship between the air and surface warfare communities in most developed nations since Desert Storm. At bottom, that relationship has entailed an increasingly open and heated dispute over fundamentals in a struggle between one long-accepted frame of reference and another that purports to be better.

¹⁶Thomas S. Kuhn, *The Structure of Scientific Revolutions*, Chicago, University of Chicago Press, 1962, p. viii.

By implication, Kuhn tells us much about the selective images of combat held by the various services in his characterization of how scientists of different upbringing perceive a common phenomenon: "On the road to professional specialization, a few physical scientists encounter only the basic principles of quantum mechanics. Others study in detail the paradigm applications of these principles to chemistry, still others to the physics of the solid state, and so on. What quantum mechanics means to each of them depends on what courses he has had, what texts he has read, and which journals he studies."¹⁷ With the necessary changes for context, the same can be said with respect to the various protagonists in the current defense debate, not only between airmen and land warriors, but also, in some cases, among airmen themselves. It tends to bear out the now-famous proposition first propounded in the early 1960s by the dean of Harvard's School of Public Policy, Don Price, that where you stand depends on where you sit. It further explains why the gradual acceptance of new paradigm categories over time is typically accompanied by resistance, often to the point of intransigence, on the part of the old school.

In military doctrine no less than in the natural sciences, as Kuhn has shown, the triumph of new ideas must invariably contend along the way with "lifelong resistance, particularly from those whose productive careers have committed them to an older tradition." Kuhn explains how "the source of resistance is the assurance that the older paradigm will ultimately solve all its problems. . . . Inevitably, at times of revolution, that assurance seems stubborn and pigheaded, as indeed it sometimes becomes. But it is also something more."¹⁸ Up to a point, at least, it is a natural and healthy phenomenon which helps ensure that the old paradigm "will not be too easily surrendered" and that any ultimate shift in outlook will be both valid and warranted.¹⁹ Pending the completion of such a shift, the embattled and obsolescing paradigm also remains a necessary key to cognitive consistency and to the ability of its holders to operate effectively within the existing framework.

¹⁷Ibid., p. 50.

¹⁸Ibid., pp. 151-152.

¹⁹Ibid., p. 65.

The problem in the case at hand here, however, is that the would-be "new paradigm" of joint force employment is anything but self-evidently an air and space power paradigm. True enough, some air power proponents since Desert Storm have argued as though an imminent shift to an aerospace-dominated strategy is all but a foregone conclusion, save only for those benighted obstructionists in the surface warfare world who seem so consistently unable to see the light. Yet the surface warfare world has made a no less determined counterclaim to being the vanguard of the military-technological revolution. Land warriors are now professing no less vigorously than airmen that it is *they* who are the keepers of any "new paradigm" of joint warfare.

A major part of the basis for this counterclaim by the land warfare community is that recent improvements in information fusion and precision target attack have enhanced the combat capability of *all* services and force elements. By way of example, former U.S. Air Force chief of staff General Larry Welch has noted that irrespective of the medium, the essence of the emerging change in force capability includes high lethality on the first mission, near-complete freedom of operations from the outset of combat, round-the clock operations enabling a constant high pace while giving the enemy no sanctuary, and the dominance of combat operations by information.²⁰ However much these attributes may represent what air and space power do uniquely best in joint warfare, they are not exclusive attributes of air and space power by any means.

Accordingly, if the promise of air and space power is to be realized, merely the strength of a compelling idea will not be enough to bring it about. As Thomas Keaney and Eliot Cohen pointed out in their summary report of the U.S. Air Force's Gulf War Air Power Survey, "the ingredients of a transformation of war may well have been visible in the Gulf war, but if a revolution is to occur, someone will have to make it."²¹ That being so, the first challenge for those air power proponents who purport to be the keepers of the new paradigm is to

²⁰General Larry D. Welch, USAF (Ret.), "Dominating the Battlefield (Battlespace)," briefing charts, no date given.

²¹Thomas A. Keaney and Eliot A. Cohen, *Revolution in Warfare? Air Power in the Persian Gulf*, Annapolis, Maryland, Naval Institute Press, 1995, p. 212.

engage their counterparts in other combat arms in candid awareness of what air power *can not* do and with candid respect for the intellectual and historical origins of the differing views held by their fellow professionals in the surface forces. Equally important, it behooves airmen to acknowledge what their surface-warrior brethren continue to offer the joint force commander by way of needed combat capability, even in the face of the quantum improvements that have recently occurred in the instruments of air warfare.

More to the point, airmen must argue convincingly to those of the putative "old school" that there not only is a better way through air and space power, but one that promises to underwrite the mission needs of surface warriors no less than those who fly. Toward that end, they could benefit enormously by heeding the observation of Harvard political scientist Richard Neustadt years ago that the essence of influence lies in persuading those of different opinions that one's own version of what needs to be done by them "is what their own appraisal of their own responsibilities requires them to do in their own interests."²² U.S. Air Force General John Jumper was plainly acting in the spirit of that injunction when he commented that "in the end, all airmen want to do is make the ground guy's job easier. We're trying to save some lives here, and we truly think that in this era, as in Desert Storm, if we can get in, and while the ground force is building up . . . we think that by the time that decisive ground engagement is necessary, we may not have to do it, or if we have to do it, it may look very much like the 100-hr campaign they had on the ground in Desert Storm."²³ Although skeptics in green might be forgiven, at least for a time, for doubting the underlying sincerity of such a statement, it nonetheless represents the tone that needs pressing the hardest by airmen in their dealings with surface warfare professionals on the roles and missions front.

Second, airmen must own up to the fact that achieving and maintaining air superiority is only a part of the air power story, a necessary but insufficient condition for air power to lay convincing

²²Richard E. Neustadt, *Presidential Power*, New York, John Wiley and Sons, 1963, p. 49.

²³Lieutenant General John Jumper, USAF, "Air Power Initiatives and Operations: Presentation for the European Air Attache Conference," annotated briefing, no date given.

claim to having become the predominant force. Because airmen have dwelled so vocally and for so long on the themes of air superiority and “strategic bombing,” successive generations of army leaders, in a major misperception of air force motives, have come to view their air force counterparts as focused almost exclusively on wanting to go out and defeat an enemy’s air force and then to continue deep to bomb his heartland, in effect fighting their own private war and, in the process, hoarding sorties for their own ends rather than providing needed support to ground commanders.

Part and parcel of any such acknowledgment that air superiority is only a buy-in condition for air power to exercise its combat function that matters most in joint warfare, namely, attacking an enemy’s war-waging capacity, must be for airmen to repudiate, once and for all, Douhet’s signature axiom that “to have command of the air is to have victory.”²⁴ That statement was false when it was first made in 1921, and it is no less false today. Although control of the air is an indispensable precondition for joint-force victory on the ground, air power must also be able to perform the job on the ground faster, better, and less costly in terms of friendly casualties than ground forces if its proponents are to justify their claim to its being the force of first choice. What has lately come to be called “air dominance” will always be important to the success of joint force campaigns. However, it is not now and never was air power’s principal stock in trade.

Third, and relatedly, the new capability and promise of air power require that airmen unburden themselves of past teachings with respect to the utility of urban-industrial bombing to undermine an enemy’s will to fight. Not only have the core arguments of those teachings been shown to be baseless in fact, technology and new force employment options now permit a conception of air warfare that is genuinely “strategic,” yet focused more directly on an enemy’s instruments of military power. The improved and still-improving ability of air power to produce combat results on the ground both rapidly and decisively has invalidated many of the often-voiced doubts prompted by a reading of classical air power theory. This implies a need for air planners to change their measures of effective-

²⁴Giulio Douhet, *Command of the Air*, Washington, D.C., Office of Air Force History, 1983, p. 25.

ness by shifting their attention to air power's newly acquired capability against an enemy's fielded forces if they are to ensure that air power theory remains relevant to the needs of joint force commanders.

More to the point, it is time for airmen to bid farewell to the now-outmoded arguments espoused by Douhet and subsequent air power advocates on behalf of urban-industrial bombardment and, instead, to play up the *new* things that modern air and space power can now do. Point one in this respect is to acknowledge that air power can now quickly destroy or neutralize enemy armies and surface navies anywhere. Airmen have not articulated this case very clearly or effectively. Toward that end, Air Vice Marshal Mason has suggested a need to review critically the image of strategic bombardment put forward by the early theorists of air power because of the extent to which it has become discredited over the years as a result of its stress on the targeting of innocents. The equating of strategic attack with urban destruction, Mason points out, not only gave it invidious associations with the firebombing of Dresden and Tokyo in World War II but, worse yet, "inhibited a wider realization of air power's complete potential."²⁵

Fourth, and directly derivative from the above, air power practitioners need to develop a theory of air power application in land warfare on a scale of the classic theories of "strategic bombardment," yet one that focuses more directly on the prerequisites for attacking and destroying an enemy's fielded army. In contrast to the highly sophisticated planning assumptions that underlay the coalition's SEAD campaign in Desert Storm, there was nothing comparable to inform allied planning for air operations against the Iraqi army. The latter were guided by little more than classic attrition warfare thinking.

Similarly, CENTCOM had a theory for attacking Iraq's "strategic" infrastructure that was imbedded at the center of Colonel John Warden's Instant Thunder attack plan. Unfortunately, that theory did not deliver on its promise. Nevertheless, the Instant Thunder approach at least was built on an organizing concept of a sort that CENTCOM lacked for that part of the air war that fortuitously worked

²⁵Mason, "The Future of Air Power," p. 3.

so well in the end, namely, those portions of the air campaign that were targeted against Iraq's ground forces. Had it possessed such a concept, allied air operations might have given the joint force commander, General H. Norman Schwarzkopf, both greater going-in confidence and greater economy of force in the neutralization of Iraq's army. Instead, as Williamson Murray has pointed out, planning for air attacks against Iraqi ground forces followed a reductionist approach in which the planners "simply racked up targets—so many tanks, so many artillery pieces, so many ammunition dumps, etcetera—and then worked their way down from the top of the list. Nowhere in the planning documents . . . was there an effort to use air power in an operational sense, as a lever to gain larger strategic effects by attacking certain portions of the enemy's ground structure, to cripple the whole."²⁶ As a result, notes Price Bingham, "it was more by accident than design that the coalition's air interdiction made the Iraqis unwilling to risk large-scale movement."²⁷

Fifth, if air power proponents are to have any influence in helping to bring about a transformation in joint force employment strategy that makes the most of what recent improvements in aerospace technology have to offer, they will need, as a first order of business, to stop talking in terms of "dominant air and space power," a proclivity that has needlessly put the other services on the defensive in the budget wars. Instead, they should focus on how aerospace power can contribute toward making the job of ground forces easier. Toward that end, there surely must be more imaginative ways of thinking about the changing relationship between air and land power than simply in reductionist "either-or" terms. For instance, indirect fire support from the air, if well-directed, lethal, and timely, can enable ground commanders to do things differently, as well as to do different things with their forces. Among other options one might imagine, it can hold a forward line until ground troops arrive on scene to secure it. It also can deter or disrupt and delay large-scale invasions even if friendly ground forces have not yet deployed to a threatened theater in fighting strength.

²⁶Williamson Murray, "Ignoring the Sins of the Past," *The National Interest*, Summer 1995, pp. 100–101.

²⁷Price T. Bingham, *The Battle of Al Khafji and the Future of Surveillance Precision Strike*, Arlington, Virginia, Aerospace Educational Foundation, 1997, p. 14.

EFFECTING A NEW WAY OF WAR

Mindful of the emerging competition over roles and resources that was foreshadowed by air power's surprisingly effective performance in Desert Storm, Air Vice Marshal Mason warned in 1994 of "a danger that sensible and necessary debates about air power may be threatened by a reemergence of zealotry on the one hand and obtuseness on the other as resources are reduced, threats diminished, and role responsibilities blurred."²⁸ To a dismaying extent, that is exactly what has occurred in the years since. In a thoughtful contribution to the post-Gulf war defense debate, Mason called for a stern exorcism of the sort of air power excessiveness that was reflected in the exaggerated claims of Giulio Douhet, which not only had needlessly polarized discussion of strategy alternatives among the services for decades, but were wrong both in overestimating the ability of aerial bombardment to break the will of an opponent and in denigrating the continued need for ground and naval forces alongside strategic air power.

As for those latter-day air power proponents who would exploit the success of the Gulf air campaign to rekindle the flame first lit by the early air power advocates, Mason retorted that insofar as air power could be said to have predetermined the outcome of Desert Storm, it was "a result of strategic, operational, and tactical simultaneous synergism, not from any reincarnation of Douhet." As an antidote to further controversy over false issues, he suggested that it was past time "to place air power into the continuum of military history, to emphasize not just its unique characteristics, but the features it shares, to a greater or lesser degree, with other forms of warfare." Mason added that the preeminence of air power "will stand or fall not by promises and abstract theories, but, like any other kind of military power, by its relevance to, and ability to secure, political objectives at a cost acceptable to the government of the day."²⁹ He later noted, more succinctly, that airmen will succeed in establishing any air and space millennium that may be in the offing *only* when

²⁸Mason, *Air Power: A Centennial Appraisal*, p. xvi.

²⁹*Ibid.*, pp. 273–274.

decisionmakers, legislators, and taxpayers can be persuaded that what airmen have to offer is "the most attractive show in town."³⁰

Recent developments in the combat capability of air power have made possible a new way of war entailing entirely new concepts of operations. Thanks to precision, stealth, and expanded information availability, airmen are now paradoxically able to apply air power as first envisioned by the early advocates, but not in a way that they could even remotely have foreseen. Three years after the Gulf war ended, the Joint Force Air Component Commander, General Charles Horner, put it this way: "I've come to the conclusion that war has profoundly changed. I think that air power is equal to land and sea power. I don't think it's superior. . . . Each war must be determined on the circumstances involved in that war—the environment, the aims, the political goals, the nature of the enemy forces, and the nature of the friendly forces. But there are those who still believe that air power is subservient, particularly to land, and also to sea power. That is absolutely wrong."³¹

In pursuing improvements through the new options held out by information technology and precision firepower, decisionmakers must take care to avoid lapsing into complacency. The promise of new technology indeed offers a windfall byproduct in enhanced deterrence, since potential enemies will naturally be loath to challenge such proven capability if the resulting disparities in combat prowess are well known and understood, as clearly they were by most on-lookers in the early aftermath of Desert Storm. Yet this same technology edge can spur a race by have-nots to develop asymmetrical countermeasures. Retired Indian army Brigadier V. K. Nair set the tone in this respect by describing what determined Third World countries might do on the cheap to negate the superior technology shown by the coalition in Desert Storm.³² Near-term options along

³⁰Air Vice Marshal Tony Mason, RAF (Ret.), "Air Power in Transition," presentation at a conference on "Canada's Air Power in the New Millennium" sponsored by the Canadian Forces Air Command, Winnipeg, Manitoba, Canada, July 30, 1997.

³¹General Charles A. Horner, USAF, "New Era Warfare," in Alan B. Stephens, ed., *The War in the Air: 1914–1994*, Canberra, Australia, RAAF Air Power Studies Center, 1994, p. 332.

³²V. K. Nair, *War in the Gulf: Lessons for the Third World*, New Delhi, Lancer International, 1991.

these lines could include dedicated attacks against high-value soft targets such as Joint STARS, AWACS, and tanker aircraft.³³ Attacks on airlifters moving war materiel into an embattled theater and special operations or theater missile strikes against forward-area terminals and other allied bases could make for additional options. And, of course, there is the ever-present possibility of a desperation resort to a counterdeterrent based on nuclear and other weapons of mass destruction.

In all, however effective and promising they may appear to be today, the new capabilities of air and space power that were so impressively foreshadowed during the 1991 Gulf war portend no "end of history" with respect to the enduring dialectic between offense and defense. One of the most demanding imperatives facing allied force development across the board in the coming years will be to ensure that today's one-sided predominance over potential troublemakers remains in effect for the indefinite future. That will require not resting on the laurels of the gains achieved to date, but continuing to invest as necessary to stay ahead of potential countermeasures that might even the odds.

Beyond that, one must remain careful not to become so mesmerized by the apparent leverage of newly emerging military technology as to lose sight of the fact that future wars will not invariably offer easy going for the wielders of such technology. As Colin Gray has warned, "decisive maneuver, the decisive laydown of firepower against carefully selected targets (hopefully, the assets that comprise the enemy's center of gravity), the achievement of surprise, and so forth—assuredly can achieve the all but 'free lunch' effect. Nonetheless, historical evidence, as well as common sense, suggests that competent foes, large and small, typically require a lot of beating. . . . Silver bullets and even magic swords may well exist, but they should not comprise the leading edge critical to a general theory of success in war."³⁴ If defense planners are to succeed in institutionalizing any revolution

³³Following a seminar at the Zhukovskii Air Force Academy in Moscow in 1992, a Russian Air Force general assured me that had he been running the Iraqi Air Force, allied AWACS, Joint STARS, tankers, and airlift aircraft would have been at serious risk—to high-speed ramming attacks, if necessary, to achieve the desired political effect.

³⁴Colin S. Gray, "All That Glitters, , , : Revolutions in Military Affairs (RMA) and the Perils of Very High Concepts," unpublished manuscript, August 1996, p. 26.

in air and space technology that may now lie within their grasp, they will be aided greatly by remembering General George S. Patton's warning about how easily people can fool themselves into believing that wars can be won by some wonderful invention rather than by hard fighting and superior leadership.

Nothing in this chapter has been intended to suggest that air power can win wars without ground or naval involvement, possibly even significant involvement. Nor has the chapter sought to suggest that air power will, in each and every situation, inevitably be more important than land or sea power. On this point, most airmen have gone out of their way not to overgeneralize from Desert Storm. Said General Horner in this respect: "I think we showed in this circumstance, not in every circumstance, that an air campaign can be used to achieve military goals with a minimum loss of life on both sides."³⁵

That said, one can argue with growing confidence that the air power assets of all services now have the potential to carry the bulk of responsibility for beating down an enemy's fielded forces of all kinds, thus enabling other force elements to achieve their goals with a minimum of pain, effort, and cost. More than that, one can argue that air power in its broadest sense, including such vital adjuncts as surveillance and reconnaissance in addition to combat platforms, munitions, and the mobility assets needed to deploy them, has fundamentally altered the way major wars will be fought over the next two decades through its ability to carry out functions traditionally performed at greater cost and risk by other force elements. Most notable among these are its demonstrated capacity to neutralize an enemy's army with a minimum of casualties on both sides and its ability to establish the preconditions for achieving strategic goals from the very outset of fighting.

Thanks to these new capabilities, air and space power, coupled with information power, now offers the promise of being the swing factor in an ever-widening variety of circumstances. As the great enabler, it has every chance of becoming even more capable and effective if the possibilities now before it are properly cultivated. That suggests that

³⁵Barry Shlacter, "A U.S. General Assesses the War After One Year," *Fort Worth Star-Telegram*, February 17, 1992.

the primary role of land power in future circumstances involving large-scale enemy aggression with massed armor and infantry may now be increasingly to *secure* a win rather than to achieve it.

Just to be clear on an important point, this in no way vitiates the recurrent insistence of land combatants that only ground forces can administer the final blow should an enemy refuse to knuckle under in the face of withering air attacks against his combat capability.³⁶ Nor does it challenge the equally valid point made by surface warriors that the object of future land warfare should be to make close-in killing "a coup de grace rather than a bloody battle of attrition."³⁷ The question of questions, however, concerns what measures now make the most sense for doing the hard work needed to position those ground troops so they can deliver the coup de grace, should one be required, both rapidly and with minimal risk to their own survival.

In this respect, there is growing ground for maintaining that a sweeping change has begun to take place in the classic relationship between air and surface forces when it comes to defeating attacks by enemy armored and mechanized units. In and of itself, that nascent change may or may not add up to a full-fledged "revolution in military affairs." Without question, however, it attests to a quantum improvement in the strategic effectiveness of air power in *all* services when compared to the leverage of more traditional ground force elements in modern war. That, perhaps more than anything, is the essence of the transformation that has taken place in the capability of the air weapon since Vietnam.

³⁶See, for example, the comment by since-retired Army Lieutenant General Jay Garner to this effect in Capaccio, *Defense Week*, November 18, 1996, p. 15.

³⁷Brigadier General Robert H. Scales, Jr., USA, *Certain Victory: The U.S. Army in the Gulf War*, Washington D.C. and London, Brassey's, 1994, p. 367.

**THE CHALLENGE FOR THE ROK AIR FORCE IN THE
21ST CENTURY**

Song-Kuk Park

INTRODUCTION

Since the Soviet Union collapsed, the Cold War era is believed to be over. Contrary to our predictions, regional conflicts due to ethnic, religious, territorial, economic, and natural resource problems are increasing even more in the post-Cold War period. The Korean peninsula is known as the only place where traces of the Cold War still remain. Military confrontation between South and North is threatening not only our national security but also regional peace and stability.

North Korea, having one of the world's largest military forces, is a major threat to our national security. In North Korea, more than one million troops, about 4,000 tanks and 500 battleships, and in excess of 800 fighter aircraft are deployed toward the South.¹ Kim Jong Il's strategy on reunification and diplomatic relations still relies upon military power. North Korea has independent capability to deliver disastrous chemical, biological, and nuclear warheads. Another Korean war, if one occurs, may have disastrous results due to the casualties and massive destruction. Accordingly, our military readiness should focus on deterrence. In case of war, however, we have to win, and support national reunification while minimizing

¹The ROK Ministry of National Defense, *Defense White Paper* 1997-8.

casualties and damage to South Korea's infrastructure. Thus, our national requirement forces us to pursue a fast and "clean war." Air and space power through their inherent speed, range, and precision can respond to this need by delivering precision strikes, supplies, or surface forces where and when they are needed.

Another form of military action we have to concern ourselves with is low-intensity conflicts with neighboring nations. Our national policy clearly states that our diplomatic relations with neighboring countries will be developed and maintained based on friendship and mutual support. However, national security by its nature requires us to consider all possibilities. Disputes with and among neighboring countries on air and sea control, territorial and environmental problems, and under-sea resources development are now arising. Our military capability is not aimed to dominate or win a war with those nations but to protect national interest and assets in the worst case of a conflict. Consequently, it is necessary for our nation to retain a military capability that is small but able to react quickly, precisely, and with the necessary range. The history of the Korean peninsula indicates that such a capability is essential to the national security. Again, air and space power of the ROK Air Force will take the leading role for this type of readiness.

This chapter discusses directions to develop the roles and structures of air and space power of the ROK Air Force for the 21st century.

A NEW ERA IS COMING

In the past, head-on-head collisions were common. That is, in the context of military power, tanks were mainly used for counter-attacking enemy tanks, warships were used for defeating enemy warships, airplanes were deployed to counter enemy airplanes. It was a symmetric engagement.

Early in this century, mankind evolved land/sea operations to land/sea operations supported from the air. Then, air power grew to be indispensable to the protection of national interests. During the 1991 Gulf War, the 38-day air campaign concentrated land-based tactical fighters, carrier-based airplanes, and long-range bombers in an intense campaign to destroy Iraq's ability to fight effectively. Following the air campaign, coalition ground forces completed the

defeat of a 42-division force in about 100 hours with fewer than 100 Americans killed and wounded.² Since the Gulf War, this type of asymmetric engagement has been more common.

In the last decade there has been another giant leap forward. Terrestrial operations are now supported from space. In the Gulf War, the United States used Navstar Global Positioning System (GPS) satellites to guide precision weapons and navigate in an unfamiliar terrain. Its 24 satellite constellation beams continuous navigation signals to earth, allowing users to determine their location within 16 meters, velocity within a fraction of a mile per hour and the time to within a millionth of a second. Satellites with infrared telescopes saw the faint heat of SCUD missiles from more than 22,000 miles away, so the United States could warn their troops and allies. Weather, communications, and intelligence satellites contributed in many invaluable ways to the success of their operations from halfway around the world. General Fogleman is often quoted as saying, "I think that space, in and of itself, is going to be very quickly recognized as a fourth dimension of warfare."³

The more recent history of the application of air and space power, especially post-Desert Storm, has proven that air and space power now has the potential to be the dominant and, at times, the decisive element of combat in modern warfare. Air and space power have changed the way wars are fought. The traditional three-dimensional battlefield has now shifted into a fourth medium with the use of air and space power. It would appear inevitable that early in the next century space power will become as indispensable to our success as air power.

Since the launch of Sputnik on October 4, 1957, space has become increasingly crowded. Today there are more than 8,000 known objects orbiting the earth and nearly 900 satellites are operating in space. In the next ten years, more than 1,000 satellites are projected to be launched.⁴ Today, more than 1,100 commercial companies

²Andrew P. Leyden, *Gulf War Debriefing Book: An After Action Report, Appendix F: Casualties and POWs*, April 1997.

³The U.S. Space Command, *Long Range Plan*, 1998, p. 2.

⁴*Transforming Defense, National Security in the 21st Century*, Report of the National Defense Panel, December 1997.

across 53 countries are developing, manufacturing, and operating space systems. By the end of the century, it is estimated that more than 20 nations will have space-based intelligence and targeting capabilities. According to intelligence estimates, over the next 10 years, several Third World countries will develop the technology and capability to launch intercontinental ballistic missiles. North Korea launched the first medium-range Taepo Dong I ballistic missile last year. The launch probably had multiple purposes, including serving both as an advertisement for the country's missile technology and as a bargaining chip to win concessions from other countries. Also, our country will launch 19 more satellites on-orbit with several missions by 2015.⁵

General Myers,⁶ in his speech at the Air Force Association in 1998, said, "Space has become a military and economic center of gravity. So much of the world standard of living, so much of its commercial wealth, depends on space." The nation's dependence on space capabilities in the future, rivals its dependence on electricity and oil in the past. Electricity and oil were critical parts of the industrial revolution; space capabilities are emerging as vital to the information revolution.

In the 21st century, military operations will rely even more on such services as global communications, reconnaissance and surveillance, missile warning, weather, and navigation. Only these information services and space capabilities can provide dominance on the battlefield and allow for precision engagement.

Many things are changing as we approach the new era. The lead time might be longer, the time of engagements shorter, the systems more complicated, missiles more prevalent, and a reliance on space-based assets common. Precision, range, lethality, speed, and versatility are all greater than in the past. Such changes will continue.

⁵The Republic of Korea Ministry of Science and Technology, *National Space Master Plan*, November 1997.

⁶Commander in chief of North American Aerospace Defense Command (NORAD) and US Space Command (USSPACECOM) and commander of Air Force Space Command (USAFSPACECOM).

Preparing now for the military challenges of air and space power in the 21st century is essential to our national security.

AIR AND SPACE POWER IN THE 21ST CENTURY

The Air Force's basic functions are the broad, fundamental, and continuing activities of air and space power. Air and space power is intrinsically different from either land or sea power, and its employment must be guided by axioms different than those for surface forces. Both the air and space mediums involve operations in three dimensional space. While airpower is primarily affected by aerodynamics, space power is guided by the principles of orbital mechanics, and is not limited by the vertical extent of the atmosphere. Both share the advantages of three-dimensional maneuvers, such as overlooking enemy positions and the ability to maneuver beyond enemy surface forces, and both are inextricably linked by warfighting principles.

Air and space power can deter an adversary from taking actions against our national interests by providing the capability to project potent military power in a matter of hours. It is the knowledge that air and space intelligence, surveillance, and reconnaissance systems are closely watching their activities and that land-based fighter and attack aircraft are available to sweep the skies and prevent movement of ground forces with a large variety of capabilities, which gives an adversary reason to pause and reconsider his objectives and plan of action.

Air and space power has become the great enabler that allows all land, sea, and special operations forces to optimize their contributions to national security. Without air and space superiority, air and surface operations would be exceedingly hazardous. Without rapid airlift, timely response to crises would be virtually impossible. Without our information gathering and dissemination systems, all operations would proceed much more ponderously, and with greater risk of surprise.

Thus, operations in each of the three realms of air, space, and information are synergistic and overlapping. Therefore, air and space power is defined as the integrated application of air and space systems to project strategic military power.

The power that the air force can employ in the world of the 21st century is critical to the national ability to survive and prosper in a complex, interdependent, constantly changing security environment.⁷ As we construct adequate power to perform successful air and space power functions in the 21st century, the requirement to be flexible is highlighted.

Most air and space forces can perform multiple functions to achieve various strategic, operational, or tactical effects; some perform them in unique ways. It is this inherent versatility, when combined with the speed, flexibility, and global nature of our reach and perspective, that generates the unique Air Force contribution to joint force capabilities. These battle-proven functions⁸ can be conducted at any level of war and enable the Air Force to shape and control the battle space.

- **Counter-Information.** Counter-Information seeks to establish information superiority through control of the information realm. The focus of the effort is on countering the enemy's ability to attain information advantage.
- **Counter-Air and Space.** Counter-air and space function consists of operations to attain and maintain a desired degree of air and space superiority by the destruction or neutralization of enemy forces. The main objectives of counter-air and space operations are to allow friendly forces to exploit air and space capabilities, while negating the enemy's ability to do the same.
- **Strategic Attack.** Strategic attack refers to operations intended to directly achieve strategic effects by striking at the enemy's center of gravity. Strategic attack should affect the enemy's entire effort rather than just a single action, battle, or campaign.
- **Counter-Land.** The main objectives of the counter-land function are to dominate the surface environment and prevent the opponent from doing the same. Counter-land involves those operations conducted to attain and maintain a desired degree of superiority over surface operations by the destruction or

⁷The U.S. Air University, *U.S. Air Force 2025*, August 1996, p. 43.

⁸The U.S. Air Force, *Air Force Basic Doctrine*, Air Force Doctrine Document 1, September 1997, pp. 46–60.

neutralization of enemy surface forces. This direct attack of adversary surface operations by air and space forces is the essence of asymmetric application, and is a key to success during operations to decisively halt an adversary during initial phases of a conflict.

- Counter-Sea. Counter-sea functions are an extension of Air Force functions into a maritime environment. They include sea surveillance, antiship warfare, protection of sea lines of communications through antisubmarine and antiair warfare, aerial mine-laying, and air refueling in support of naval campaigns.

ORGANIZING AIR AND SPACE POWER IN THE ROK AIR FORCE FOR THE 21ST CENTURY

The nature of the force available in the 21st century will determine the effectiveness of the power of the ROK Air Force. Hence, force structure decisions made now are crucial to the strategic environment of the future. The key challenge for the ROK Air Force is to build an efficient and smart air force to ensure the core competencies of air and space power, that is, information superiority, air and space superiority, precision engagement, and agile combat support.⁹ The core competencies represent air and space power capability embodied in a well-trained and well-equipped air force. The core competencies are essential for sufficiently capable air and space power functions. Utilizing them will allow the Air Force to achieve dominance in air and space to protect the nation, its assets, and its citizens. This is what enables the timely, effective application of our capabilities. It permits the Air Force to do things first, as well as farther, faster, and better than an opponent.

Enhancing Air Power

Airpower, in the midst of a technological and philosophical evolution, will become the "strategic instrument of choice" for the nation's

⁹*Ibid.*, pp. 27-35.

leaders because of its ability to make war—or influence peace—decisively, accurately, over long ranges, and on short notice. Air power has arguably become the dominant force element in most circumstances of war. Ever since World War II, it has provided ground forces with the freedom to operate, unmolested, from above. Now, through a combination of technological development and astute concepts of operations, it could become an even more pivotal element of national power. The past decade has seen many air power instruments evolve from advanced development to operational use.¹⁰ Today, air weapon systems promise to generate even more dramatic changes on the battlefield, further widening the gap between states that possess them and those that do not. This implies that the key to ensure our national security is to properly equip our Air Force with the weapon systems for future air operations.

The current national economic situation and the limited defense budget require our force enhancement programs to be prioritized as they proceed. When it comes to investment priority, fighter aircraft must be considered first since it is the means and basis for exercising airpower, while the other systems are to provide improved efficiency, effectiveness, and survivability of our assets. Considering the national security environment and the threats, the fighters currently being deployed in the ROK Air Force have some deficiencies in terms of range, maneuverability, accuracy, and munitions. Consequently, the advanced fighter program, known as the F-X program, is the most time critical and thus has the highest priority. With the F-X fleet, most of our critical strategic requirements could be satisfied. We will be able to achieve fast air dominance over the North Korea Air Force and deliver all kinds of state-of-the-art precision munitions with coverage of the entire peninsula. The F-X fleet is also the only means to destroy or neutralize North Korea's strategic weapon systems, regardless of their location. It will also provide us with quick-reaction capability in case of conflicts with neighboring countries. Hence, the F-X program could be the basis of our national defense even after reunification, should it occur in the near future as expected.

¹⁰ Benjamin S. Lambeth, "Technology and Air War," *Air Force Magazine*, Vol. 79, No. 11, November 1996.

The next priority should be given to building our independent operational capability. The scale and capacity of the air power retained by each country may differ in accordance with national environment, strategic objectives, threats, etc. However, all air forces are equipped with similar weapon system structures. These consist of intelligence and surveillance systems, combat and support forces, and C4I systems. Figure 7.1 shows the weapon system structure required for a modern air campaign. The current status of the weapon system structure of the ROK Air Force is also presented in this figure.

As indicated, the ROK Air Force is not properly equipped for independent air operations. The Air Force's efforts to build a proper weapon system structure have continued for decades without reaching the ultimate goal. As a result, our independent operational capability still remains restricted.

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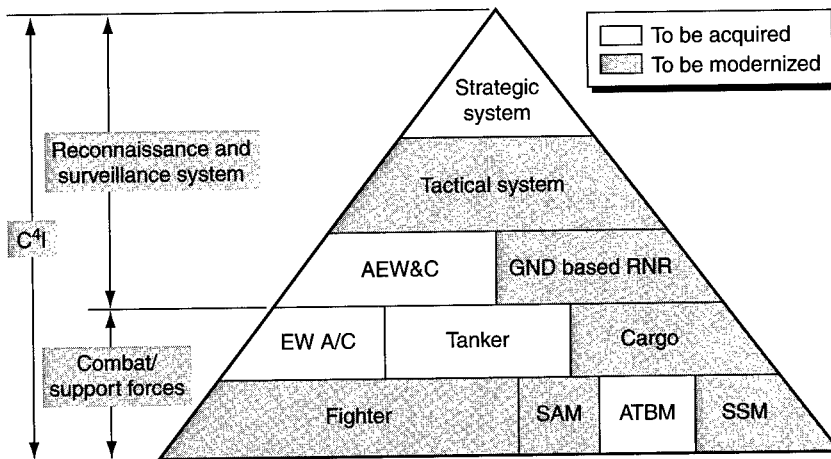


Figure 7.1—Air Force Weapon System Structure Required for the 21st Century

Our national defense policy is based on the ROK-US combined defense system, and the combined Air Force is believed to have enough capability to defend our nation. The ROK Air Force, however, should

be able to perform all sorts of air operations independently for the following reasons:

- An independent nation requires its own independent military operational capability.
- U.S. force deployment to the Korean peninsula may be too slow or not possible at all if the United States is involved in wars in several different parts of the world.
- The role and operations of U.S. forces may be limited in the event of a military conflict—however small the possibility—with neighboring countries.

The independent capability of the ROK Air Force should be able to take a key role, without the support of U.S. forces, to deter the North Koreans and prevent North Korea's air superiority. As a deterrent force, the ROK Air Force should have the capability to deliver immediate and punishing responses to North Korean acts of aggression. The ROK Air Force also should be able to deter by providing a robust defense capability and maintaining information, surveillance, and reconnaissance dominance. For the North to have any chance of success in a conventional attack against the ROK, they would need to exploit the element of surprise.¹¹ The ROK Air Force should be able to respond immediately and deny the North any such opportunities.

To protect our national interest and resources from potential conflicts with neighboring countries, quick-reaction forces that are capable of exercising all types of air operations in the Korea Air Defense Identification Zone (KADIZ) are also required. Understanding that successful air operations greatly depend on the capability of weapon systems, it is important to have advanced high quality systems. This does not imply that our Air Force must become a superpower. Quick reaction, precision engagement, and extended combat range are the core capabilities to be achieved. The size of high quality weapon systems will be small enough so that neighboring countries may not consider them a threat against their vital national interest.

¹¹Col. R. Eskridge, *U.S. Airpower's Role in 21st Century Korea* presented at 4th Doctrine Development Seminar hosted by ROK Air Force, December 8, 1998.

Undoubtedly, the advanced fighter (F-X) is the key element to satisfy the above requirements. In order to have independent operational capability, the ROK Air Force needs additional systems such as strategic intelligence systems, airborne early warning and control (AEW&C) systems, tanker aircraft, Electronic Warfare (EW) aircraft, and Anti Tactical Ballistic Missiles (ATBM), etc.¹² The acquisition programs for these systems will follow the F-X program.

Constructing Space Power

Space has been militarized for several decades. Reconnaissance, surveillance, early warning, communications, weather, and navigation satellites were designed and deployed to serve national security needs in the world. Our second immediate challenge must be constructing Space Power to perform space force operations successfully.

Space Force Operations

Today, many Air Force missions are conducted in the vertical dimension above the land and sea. These missions have been historically carried out in the atmosphere. This situation is rapidly changing. Access to and use of space is central for preserving peace and protecting national security as well as civil and commercial interests.

Air Force's space operations focus on controlling the space environment, enabling and supporting operations for terrestrial forces, supporting space forces, and applying force.¹³

- **Space Control.** Space control is the means by which we gain and maintain space superiority to assure friendly forces can use the space environment while denying its use to the enemy. Gaining space superiority is a primary goal of a military campaign and must be gained early to ensure freedom of action. Like air supe-

¹²Maj. Gen. Jin-Hak Lee, *Aiming High: Korea's Air Force Towards the 21st Century*, presented at the International Conference on Airpower in 21st Century Korea, Seoul, Korea, May 22-23, 1998.

¹³The U.S. Air Force, *Space Operations Doctrine*, Air Force Doctrine Document 4, July 1996.

riority, space superiority helps to provide the freedom to conduct operations without interference from an adversary. To accomplish this, space forces must survey space, protect our ability to use space, prevent adversaries from interfering with that use, and negate the ability for adversaries to exploit their space forces. Counter-space is the mission carried out to achieve space control objectives by gaining and maintaining control of activities conducted in or through the space environment.

- **Enhancing Operations.** Force enhancement operations consist of those operations conducted from space with the objective of enabling or supporting terrestrial forces. Navigation, communications, reconnaissance, surveillance, ballistic missile warning, and environmental sensing help reduce uncertainty and friction at all three levels of war: strategic, operational, and tactical. Enabling and supporting space operations increase a force's ability to detect, plan, and react faster than an adversary's terrestrial forces operations.
- **Supporting Space Forces.** Space force support is carried out by terrestrial elements of military space forces to sustain, surge, and reconstitute elements of a military space system or capability. These activities deploy, sustain, or augment on-orbit spacecraft, direct missions, and support other government or civil organizations. Space force support involves spacelift and satellite operations.
- **Application of Force.** The application of force consists of attacks against terrestrial targets carried out by military weapon systems operating in space. Currently, there are no force application assets operating in space, but technology could change so that force application missions can be performed from platforms operating in space. For example, space systems such as the space-based laser could provide space-based attacks against terrestrial targets and provide the timely suppression of enemy defenses to improve the penetration effectiveness of air assets.

AIR FORCE'S ROLE IN THE AGE OF SPACE

Fifty years of Air Force leadership in the air have made the Air Force the undisputed master of national air operations. If we are to

continue to be the master of air and space in the future, it is necessary to keep pace with the changing times.

The Air Force's role in the age of space can be expressed as maintaining a leadership role inside the military and building a partnership outside the military. Inside the military, the Air Force should maintain leadership in operating space power. Outside the military, the Air Force needs to build a partnership with the other forces and civil, commercial, and international communities.

Inside the Military: Maintaining Leadership

Space power is derived from national, civil, and commercial space systems and associated infrastructure. These assets include space-based systems, ground-based systems for tracking and controlling objects in space and transiting through space, launch systems that deliver spacecraft, and people who operate, maintain, or support these systems. Space power will be instrumental in getting the right military capability to the right forces, at the right time.

Space is generally recognized as an Air Force domain for several reasons.

First, air power and space power are inextricably linked as components of the vertical dimension of warfare. Space is the largest operating medium and surrounds all other operating media. There are no international agreements delineating a boundary between air and space. However, terrestrial-based forces generally operate below an altitude of 100 kilometers; whereas space-based forces operate above this altitude. In addition to this, the fact can not be overlooked that the Air Force has accumulated the technologies and experiences to operate the weapon systems in the air. Today, as an integral element of national capabilities, air power influences operations throughout the conflict spectrum. The Air Force contributes at all levels of military activities in this three-dimensional space. Tomorrow, space power and space force will take over the same role.

Second, there is a need for unity of command. Centralized control and decentralized execution are essential to the successful and optimal use of space power. General Thomas D. White said, "A lack of centralized authority would certainly hamper our peaceful use of

space and could be disastrous in time of war.” The Air Force is unique in its ability to capitalize on the attributes of space systems by being able to respond with rapid mobility and firepower to the near-real-time information afforded by systems operating in space. The Air Force’s advantage in managing space arises from the attributes of space power: (1) global coverage, (2) flexibility, (3) economy, (4) effectiveness, and (5) robustness.¹⁴ Those are very similar to the attributes of air power which the ROK Air Force has kept for 50 years. This situation is very common in many space-advanced countries in the world.

By keeping the Air Force’s leadership in space power, unity of command can be achieved efficiently and Full Force Integration can be conducted successfully.

Outside the Military: Building Partnerships

The use of space has been limited by the high cost of placing satellites in orbit. The cost of mass in orbit is approximately \$20,000 per kilogram. Many studies on space launches have searched for ways to reduce cost, but none have proposed a definite way of reducing cost substantially. General Myers said, “Space is simply too expensive, too interdependent, too complex, and too important to go it alone.” It is a real challenge.

John O’Neill at Johnson Space Center gave a suggestion, “Government and commercial partnerships in a new operations paradigm may provide lowered cost for programs and new opportunities for industry.”

As we look to the future, it is clear that resources will remain constrained. Partnering with other parties will help us to develop and field systems much quicker by cross-sharing efforts. If done correctly, our partnerships will leverage existing development efforts with a limited amount of defense funding to develop the required military capabilities.

¹⁴*Ibid.*

In the United States, the Evolved Expendable Launch Vehicle (EELV) program is perhaps the preeminent current example of partnering between the Air Force and the private sector. Boeing, Lockheed Martin, and the Air Force have each invested \$1 billion in EELV development. The effort will ensure that the next generation of U.S. commercial launch rockets will be able to meet the requirements necessary for government payloads and should reduce by \$6 billion the cost of DoD's planned launches between 2002 and 2020. In the GPS program, the customer went from giving Boeing a statement of work to providing only a statement of objectives. That helped send costs down from \$43 million to \$28 million per satellite. On-orbit lifetime has increased from 6 to 13 years.¹⁵

Future partnerships may reflect the reality that true savings and performance improvement come when the military just states requirements and stays away from telling industry how to do its job.

Unfortunately, our National Space Master Plan does not state any partnerships at the National Defense level. As one of the biggest users of space and a leader of military space, the Air Force needs to build new organizational relationships and partnerships with other government agencies and the private sector. This will allow all of us to do far more than any of us could do alone.

Air Force's Effort for the Age of Space

It is imperative that the Air Force determine where to go and how to get there. As a first step, the ROK Air Force established a "Space Systems Branch" in the Combat Development Group last year. Now the branch is working on a plan, called "ROK Air Force's Long Range Plan (LRP) for Space," that will shape our evolution from an Air Force to an Air and Space Force.

The LRP lays out operations concepts, key technologies required and lays the groundwork to examine migrating missions to space. The branch has, from the start, cooperated with the Agency for Defense Development (ADD), the Korea Aerospace Research Institute (KARI),

¹⁵Peter Grier, "Partners in Space," *U.S. Air Force Magazine*, Vol. 82, No. 2, February 1999.

the Korea Advanced Institute of Science and Technology (KAIST), and industries to ensure a credible plan. Then the members developed specified objectives, tasks, and finally, a detailed road map of goals and organizations to operate the space systems. The LRP mutually supports and is supported by the National Space Master Plan, as well as provides direction to the ROK Air Force. In the LRP, our space missions were categorized based on the four Space Force Operations.¹⁶ Major program requirements are forecasted to meet our space missions for the next 15 years. Our goal in LRP is “Constructing Foundations for Air Force’s Space Operations” by 2015.

- **Space Control.** Our nation needs to develop near real-time and near-earth space surveillance capabilities to enable our initial steps to begin space control missions. The Air Force plans to construct a Space Surveillance System by 2015. To perform its mission, the facility brings together Electro Optical telescopes, low-light-level television, and computers. Space surveillance involves detecting, tracking, cataloging and identifying man-made objects orbiting Earth.
- **Force Enhancement.** The nature of our national security interests requires military use of space systems for communications, weather, surveillance, early warning, and navigation. Space-based earth surveillance and ballistic missile warning are our key programs for Force Enhancement. The ROK Air Force will provide accurate information to the warfighter. To ensure the support in other areas, such as communications, weather, and navigation, cooperation with the civil, commercial, and international sector will be maximized.
- **Space Force Support.** In the area of Space Force Support, the civil and commercial sector will conduct a Spacelift such as launching satellite systems while the Air Force will operate military satellites and payloads. The Air Force Satellite Control Network will provide a means to maneuver, support, and sustain our national on-orbit assets. Air Force’s space operators will track the various kinds of national satellites and operate military

¹⁶*Space Operations Doctrine.*

payloads. Also, they will prepare the readiness to control those systems in war.

- **Application of Force.** Currently, there are no force application assets operating in space, but the technology and national policies of other countries could change so that force application missions can be performed from platforms operating in space. We will monitor the R&D effort of space systems such as the space-based laser and transatmospheric vehicles.

CONCLUSIONS

By way of summing up, air and space power will take decisive roles in winning a war in the 21st century. We should be aware of the important and time-critical decisions that the Air Force needs to make for the next century. I firmly believe we are at a crossroad.

To enhance airpower successfully, the ROK Air Force needs to employ such advanced weapon systems as advanced fighter for air superiority, precision guided munitions, tankers for air refueling, airborne early warning and control (AEW&C) systems, and electronic warfare aircraft for suppression of enemy air defense, etc.

The ROK Air Force puts a first-priority on the advanced fighter program over other programs in consideration of strategic need. The other programs will be implemented gradually, based on the national defense budget.

To carry out a successful evolution from an Air Force to an Air and Space Force, we will construct foundations for the Air Force's space operations by 2015. A space surveillance system will be the cornerstone on which our ability to control space will be built. We will maintain a leadership role in the areas of air and space inside the military. And we will build a partnership with the other South Korea forces, as well as with the civil, commercial, and international communities.

The ROK Air Force will strive to maximize opportunities in air and space as the use of military power evolves. This tremendous challenge can be met only by a national effort. The Republic of Korea must be prepared to devote the time and resources necessary to ensure our Air Force will meet all threats into the next millennium.

**MAXIMIZING MANPOWER UTILIZATION: CIVIL-
MILITARY COOPERATION PROSPECTS IN KOREA**

Spencer Kim

INTRODUCTION

I am not an expert on military manpower, nor am I an academic like many who presented papers in this symposium. Perhaps I was asked to make a presentation from my point of view as a businessman with quite a number of years of experience and some knowledge acquired through doing things wrong. And while the proceedings of this conference will be published as a learned symposium, my contribution is not a research paper. Pacific Century Institute, which is cosponsoring this forum, has an interest in stimulating thought and discussion that will benefit the lives of people beyond the academic circle. I offer some observations to stimulate discussion of the topic of how to obtain the greatest benefit for the expenditure of funds in military manpower utilization.

I am a U.S. citizen and my business is located there. What I am most familiar with is events in the United States. The premise of this chapter is rather basic: there is a cost-benefit in maintaining military manpower strength through the use of reserve forces. I have not studied the Korean reserve system, and I do not suggest that I am in a position to advocate a structure for their reserve. I began with a single idea, that of getting more “bang for the buck.” This is the kind of thing businessmen do. The objective of this chapter is to examine the development of the military reserve system of the United States

to determine if, and how, it gets more “bang for the buck.” How can military spending be stretched to accomplish more?

If there are lessons to be learned from this history, then I feel others will be able to apply them.

As I contemplated our second conference on air power, I reflected that to determine an air power structure, we should specify the goal we are trying to achieve through air power. In other words, why do we have military air power; what do we intend for it to accomplish? The question is deceptively simple. We have air power for national defense. But what is it we are defending? In the case of Korea, we do not want North Koreans or anyone else invading this country again. A strong military is conceived of as a deterrence to the abhorrence of war. We want the economy to continue to develop without the setback of an armed conflict or the despoiling of a plundering invader. We want the political system to be developed by citizens rather than have one forced upon us. We want personal freedoms. We want to protect and continue our national traditions and heritage.

I am at the age and stage in my professional career that I find myself thinking more and more about what I have worked for. What do I want to pass on to my children? I am not much concerned that I pass on to them a wealthy estate, but rather that I can succeed in passing on a rich family legacy. Our family tradition has its roots in the background my father passed on to me, the culture of my first homeland, Korea. Throughout the world there are large communities of expatriate Koreans who, like me, look back to that same heritage. It is important that we recognize the importance of not only defending and preserving this legacy but also considering what we can do to strengthen it so that it can endure.

KOREAN SCENE

As I visit with my friends in Korea, I hear of the following problems in its political-economic community.

1. Unemployment is up to two million in a country that has not experienced anything more than 2.5 percent unemployment in the past 30 years.

2. There is much underemployment of college graduates who are not being hired or are underutilized in their employment.
3. There exists a very high cost of infrastructure building due to: (i) high wages, (ii) high material cost, (iii) high land price, and (iv) inefficient management.
4. We see a need for renewed commitment to ethical practices in all aspects of society: police, tax collection, tax evasion, political practices, education, and business practices.
5. There are out-of-work people becoming homeless, which is creating social problems.
6. Unemployment benefits of up to one half of salary are being offered for up to six months, and political pressure is building to extend this.
7. Make-work is becoming widespread due to disorganization and inexperience in those agencies trying to cope with an economic downturn.
8. Military costs are escalating arising from the need to modernize technology and maintain high manning levels. Between 1974 and 1996, Korea spent US\$246 billion on domestic/foreign military material procurement which represents 31.8 percent of the total defense budget. The balance of 68.2 percent was used to maintain armed forces at a high degree of readiness due to the often tense military environment. The 1998 defense budget was originally US\$3.1 billion which was cut to \$2.91 billion due to IMF actions.

MY BUSINESS ORIENTATION

I read the scriptures and try to guide my life by their teachings. Sometimes I fall short. In business, Peter Drucker has come to be looked upon as having written business dogma. He has said that one should not try to solve two separate problems with one solution because the parameters of two problems are not the same. If they were the same, they would not be two separate problems. I have always found this to be sound advice, and maybe I am violating Peter Drucker's doctrine by suggesting we look at a particular solution to maximizing manpower utilization.

I am going to suggest that there is good reason to look at the concept of a “total force” integration of Korea’s military reserve and regular manpower. As I said, I am not an authority in this area, but I have read materials prepared by the experts. Using the publications to which I am going to refer, I suggest that those responsible for Korean Air Force manpower planning can learn a lot from others’ experiences.

Reserve forces can have both military (conflict) and nonconflict objectives. These might include employment of underused manpower; supplementing the police force in national disasters; training of skills with beneficial application to military or civilian life; instilling of work force discipline; inculcating patriotic attitudes that support military and national will in crisis situations; and utilization of reserve forces in infrastructure building. For example, in the United States, the Marine Corp Reserve sees community outreach as its secondary mission, and includes: (a) the Drug Demand Reduction Program aimed at youth drug prevention, (b) the Young Marines Program aimed at instilling pride, discipline, patriotism and personal commitment, and (c) Toys for Tots, providing toys at Christmas for needy children.¹

It has even been suggested that the reserves could be used for military-based training to improve basic skills of high school dropouts in accomplishing rehabilitation and renewal of community facilities. I think that may be getting too far into Peter Drucker’s warning about solving two problems with one solution. However, in thinking about national manpower as a resource, it is appropriate that these items be given consideration as supplemental benefits. It is even possible that is the area where there may be the greatest marginal return on expenditures that could alleviate some of the problems mentioned above.

Another principle that Peter Drucker is fond of promoting is that it is the job of an effective manager to change problems into opportunities. This is a good mental set when approaching problems. During the “Great Depression” of the 1930s the U.S. Army Corps of Engineers was given the task of creating employment

¹Marine Corps Order 5726.14E and MCO P1001R.1H (*Marine Corps Reserve Administrative Manual*).

through public works. While the problem was unemployment, the opportunity was to develop many projects which the Corps had previously studied and had proposals ready to advance. The Corps of Engineers predated their involvement in the depression-fighting public works projects, but it was largely because they had an inventory of project studies that enabled them to be in the forefront in the federal government's efforts to overcome the Depression.

The Corps recognizes that a future economic crisis if and when it happens will occur in a different context, and so the range and type of potential projects will be much different now and need to be given careful consideration.

Possibly, in addition to new projects, consideration would be given to reconstruction or modernization of many of the older projects completed before, during, or after the Depression. New areas such as massive urban renewal, energy, fuel storage and pipeline systems, sewer and sanitation systems, and rebuilding the nation's railroads might be suitable, labor-intensive endeavors that would benefit the general public.

No matter what happens in a future Depression, the Corps of Engineers will be well served by recalling some of the key factors of its success during the 1930s:

1. An efficient, decentralized organizational structure that delegated authority to professionally staffed offices that were responsive to local needs and requirements.
2. Special single-project districts were set up for major projects to assure their completion without undue disruption of other Corps work.
3. Professional, cautious, politically astute leadership at the headquarters level retained the respect and cooperation of the president, the Congress, the general public, the New Deal agencies, and other departments of the Executive Branch.
4. A carefully developed collection of surveyed, useful, and feasible (both from engineering and political aspects) projects was readily available for execution by the Corps or other federal construction agencies.

5. There developed a cadre of well-trained, knowledgeable engineering experts, both military and civilian, with solid administrative and management experience.²

Because there has been little attention given to nonconflict purposes in the writings I have surveyed, this chapter can do little more than suggest that consideration ought to be given to them.

THE RESERVE EXPERIENCE IN THE UNITED STATES

The issue to which I will direct the rest of this chapter is that of the potential for reducing regular military manning levels with reserve forces. In the United States the history of the reserve goes back to the founding of the nation when the constitution set up a federal military component and a state militia in each state. For more than two hundred years, the role of reserve forces in the United States has ebbed and flowed in different directions, seeking to find a structure that is both effective and politically acceptable. There was never a master plan. What has evolved has been a pragmatic solution to the tugs and pulls of the differing points of view of military practitioners and civilian politicians. Much can be learned of how politics and experience have produced compromises that have generated an effective reserve structure under the concept of total force.

The total force concept is defined by the U.S. Department of Defense as (1) reliance on reserve forces as the primary augmentation for the active forces and (2) the integrated use of all available personnel, both active duty and reserve. The key idea is the concept of integration. Reserves elements are trained and administered to be an integral part of the total military force.³

State militias evolved into state National Guard units, which have become federalized and integrated into the reserves, but which are still available for call-up by state governors.

²*The U.S. Army Corps of Engineers and the Great Depression (1929–1941)*, the U.S. Corps of Engineers Historical Division, July 2, 1980, unpublished.

³*Assessing the Structure and Mix of Future Active and Reserve Forces: Final Report to the Secretary of Defense*, RAND National Defense Research Institute, RAND, Santa Monica, 1992.

In addition to serving federal missions, the National Guard also has responsibilities for state missions. During fiscal year 1989, the National Guard was called upon to assist state governors in four civil disturbances and 53 natural disasters.⁴

Aircraft, of course, were not part of the military service until the beginning of the century, but airplanes were quickly incorporated into the military soon after their development even when they still had to be considered to be in their introduction stage. The Air Service acquired more definite status with the passage of legislation on July 18, 1914, which directed the creation of the aviation section of the Signal Corps. Anticipating the need for more trained personnel than provided by law, in 1914 the Chief Signal Officer requested legislation establishing a reserve aviation service.⁵

The Air Force Reserve was begun because it was desired to have more Air Force components than Congress had allowed, and a recognition that air power could offer an important advantage in military action. The number of Reserve Military Aviators that had completed military and civilian flying school programs before the United States entered World War I was negligible. After entry into the war, however, flying schools sprang up overnight. By November 1918, nearly 9,000 Reserve Military Aviators had graduated from schools in the United States.⁶

After WWI, the United States was quick to demobilize the military. This included the reserve as well as the regular forces. The military leaders fought to maintain at least a minimum of strength and were able to obtain some recognition from Congress, but as the experience of WWII disclosed, the military had not been well supported.

The Organized Reserve contemplated by the National Defense Act of 1920 was unlike any of its predecessor reserve programs. With the past offering no guidelines, the War Department was without guiding experience in developing the reserves. Although the Organized

⁴Departments of the Army and Air Force, National Guard Bureau, National Guard Bureau Annual Review Fiscal Year 1989, Washington, D.C., 1989.

⁵*Citizen Airmen: A History of the Air Force Reserve 1946-1994*, Gerald T. Cantwell, Air Force History and Museums Program, 1997, p. 2.

⁶*Ibid.*, p. 7.

Reserve annually increased in numbers, it was not stable between the wars.⁷

World War II required an all-out mobilization. What reserve and national guard existed were brought into active service with some difficulty and disorientation. During 1940 and 1941, the frantic efforts to integrate regulars and reservists, guardsmen, and draftees created problems: (1) morale was low; (2) guardsmen complained about the extension of their active tours beyond one year; (3) draftees felt discriminated against in the National Guard units to which they had been assigned; and (4) National Guard units resented having officers from other components assigned over them.⁸

After World War II President Truman and Chief of Staff George C. Marshall were concerned that a drop in military preparedness like that following World War I would occur.

Recalling U.S. behavior after World War I, Marshall believed the voters would reject a large peacetime military establishment. He was also certain that advanced technology would deny the United States much time to prepare for another major war. His solution was to have well-trained National Guard and reserve components fed by a system of universal military training.⁹

The National Guard's post-World War II reinstatement as the Army's first line reserve component was the compromise committed to by General Marshall in exchange for the Guard's endorsement of universal military training. Maj. Gen. Ellard A. Walsh, president of the National Guard Association, gave his public support to universal training during the Woodrum Committee hearings in June 1945. General Marshall reciprocated by advocating the guard as the second line of defense.¹⁰

However, while the National Guard was being supported by this compromise, the Air Reserve program was susceptible to budget re-

⁷Ibid., p. 21.

⁸Op. Cit., RAND, p.25.

⁹Ibid., p. 26.

¹⁰Ibid., p. 33.

ductions because Army Air Force officials could not, or would not, defend its importance.¹¹

In 1947 a commission studied the civilian components of the military. It noted that the Air Force had given reserve pilots the opportunity to maintain flight proficiency, but then largely negated the effort by failing to give them the aircraft to fly. Moreover, it had done little to maintain the efficiency of its non-flying reserve personnel. The commission regarded the Air Force Reserve composite units as ineffective because they lacked a comprehensive training plan, and it criticized the Air Force because it gave a little training to many people rather than concentrating its efforts on an essential hard core.¹²

By 1950, things had not changed much. In December 1950 a review concluded, "Because the Air Force lacked proper plans for its reserve forces, its concepts for the organization and development of reserve forces were faulty."¹³

THE AWAKENING: THE KOREAN WAR

Then in 1950 the Korean war threw 193,000 civilian airmen into service. On July 7, the Joint Chiefs of Staff approved the Air Force's projected deployment of units to the Far East. As General Vandenberg, the Chief of Staff, later observed, the United States Air Force in 1950 was "a shoestring air force." The active duty establishment's cupboard was bare, and to satisfy the needs of the war, it had to call upon the Air Force Reserve.¹⁴

However, the reserve units were not prepared for mobilization. Reservists had to be called on an individual basis. Two problems dominated the mobilization of organized units. One was that orders had to be given to reorganize the units concurrently with their mobilization. The other was the poor condition of individual records. Many reservists could not be located because of out-of-date files. Airmen's records often contained incomplete forms. Many files were

¹¹Ibid., p. 35.

¹²Ibid., p. 60.

¹³Ibid., p. 85.

¹⁴Ibid., p. 90.

missing, and one mobilized unit had files for hundreds of people not assigned to it.

Many airmen, both those who had been active in reserve units and those who had not, did not want to be mobilized for this unpopular war. Using the accepted reasons to merit exemption, reservists of mobilized units called in by the hundreds to claim ineligibility and request delays because of suddenly acquired dependents, critical job status, and ailments they had never had before.¹⁵

The breaking up of reserve units upon mobilization evoked a flurry of protest from the reservists and from congressmen representing the states in which the units were located.¹⁶

The Air Force hesitated to withdraw manpower from the organized units of the Air Force Reserve and the Air National Guard, the only trained augmentation resource available. Therefore, the individual replacements to satisfy demands of the first phase of the Korean War as well as expansion requirements, came from reservists who had not been participating in any organized program. The unfairness of this circumstance aroused great bitterness among affected reservists and became the occasion for subsequent congressional legislation.¹⁷

NEW ROLES FOR THE RESERVE

In the presidential campaign of 1952, Dwight Eisenhower criticized the Truman Administration's reserve program. Upon election, Eisenhower appointed a commission to study the need for military strength, both the regular and the reserves. In 1954 the administration, after a great deal of political maneuvering, developed the National Reserve Plan, which was passed as the Reserve Forces Act of 1955. Late in 1955, the Air Force published *Reserve Mobilization Recall Requirements*. This provided for the Continental Air Command, which began to develop the reserve force into a combat-ready mobilization asset.

¹⁵Ibid., p. 93.

¹⁶Ibid., p. 98.

¹⁷Ibid., p. 110.

The structure and vision of an effective reserve program were in place, and many people spent numerous hours on its implementation. Now the president and the Congress had new options when faced with a national interest conflict.

The first test of the new reserve program came in 1961 when the Russians blockaded Berlin.

The Assistant Air Force Chief of Staff for reserves testified before the House Armed Services committee:

All things considered, the mobilization of Air Reserve Forces in October 1961 was accomplished with a minimum of confusion and compromise with requirements. The total Air Reserve Forces recall significantly augmented the Air Force at a time when the cupboard was otherwise bare—a 17 percent augmentation in troop carrier forces, 28 percent in heavy transport, 28 percent in tactical reconnaissance, and 37 percent in tactical fighter strength.¹⁸

A second test of the concept came in October of 1962 when President Kennedy confronted Khrushchev over the missiles being shipped to Cuba. Suddenly there was a need for shifting military units to the southeastern states. Eighty C-119s flew 1,232 hours the weekend of October 12th. The buildup of forces in the southeast had begun. More than 40 Navy ships involved got under way October 15th. At scattered posts, 40,000 Marines were loaded on ships heading toward the Caribbean to augment the 5,000 at Guantanamo Bay. The Army gathered more than 100,000 troops in Florida. Strategic Air Command bombers left Florida airfields to make room for tactical fighters flown in from bases all over the country. Activating the reserves involved much more than just political posturing.

Robert Kennedy recalled, "I returned to the White House. The President was not optimistic, nor was I. He ordered twenty-four troop carrier squadrons of the Air Force Reserve to active duty. They would be necessary for an invasion. He had not abandoned hope, but what hope there was now rested with Khrushchev's revision of his course within the next few hours. It was a hope, not an

¹⁸Ibid., pp. 182-183.

expectation. The expectation was a military confrontation by Tuesday and possibly tomorrow (Sunday)."¹⁹

In evaluating the performance of the reserve at this call up, it was said,

The Air Force Reserve did absolutely all that was asked of it between October 13 and December 29, 1962. It augmented the active force in assembling material in the southeastern corner of the country. When the President thought he might need an invasion force and the Department of Defense mobilized Air Force Reserve troop carrier units as essential to the task, they responded quickly and were prepared to do their part. Then individual crew members stayed on to help redeploy the assembled force.²⁰

VIETNAM

Before Kennedy had become president in 1961, the United States had become involved in Vietnam. The United States had tried to stabilize the government and train its military forces to subdue internal guerrilla activity by the Viet Cong and resist invasion from North Vietnam. The north had declared their intention to extend the "national democratic revolution" to South Vietnam and unify Vietnam under the communist regime. Slowly but steadily over the next thirteen years, the involvement of the United States in the conflict escalated. But the United States did not mobilize reservists for use in Southeast Asia before 1968, and when it did mobilize, relatively few were called because Lyndon B. Johnson did not wish to do so. By refusing to make very extensive use of the reserve forces during the Vietnam War, President Johnson allowed the reserves to be viewed as a draft avoidance haven, and the active force came to distrust their availability in a crisis.²¹

As the war in Southeast Asia subsided, the Air Force passed more modern equipment to the Air Reserve Forces and included the reserve in force planning as part of the total Air Force. By 1973, the

¹⁹Robert F. Kennedy, *Thirteen Days* (New York), 1969, p. 109.

²⁰Op. Cit., Cantwell, p. 192.

²¹Ibid., pp 198–199.

Department of Defense had expanded the Air Force's Total Force concept into departmental policy.²²

The 1970s and 1980s saw a further developing and refining of the total force concept. The Reagan administration's military strategy was to have sufficient military strength to convince our friends to stay closely aligned with us and to convince the Soviets they could not win any war they might start against us or our allies. The defense buildup of the early 1980s affected the Air Force Reserve in many ways. The Air Force followed through on the force modernization commitment which was central to "Total Force."

PANAMA

Another opportunity to test the total force preparedness came in 1989 in the Panama military action. During the six weeks of "Just Cause," Air Force Reserve units flew a total of 621 sorties and more than 1,500 hours in direct support of the operation. They moved more than 5,000 passengers and 1.385 tons of cargo. Tankers delivered more than 1.1 million pounds of aviation fuel to 18 receivers. In combat operation they expended 220 rounds of 40-mm and 2,000 rounds of 20-mm ammunition.²³

THE BIG TEST: WAR WITH IRAQ

It was Desert Shield/Storm which stands as the largest test of the total force concept. Mobilization began August 9, 1990, one week after Iraqi forces invaded Kuwait, and reached its peak in March 1991. Even when the war ended in April 1991, the use of reserves continued until late June when most reservists had been demobilized.

In August, reserve unit commanders began to ask members which personnel might be available to serve as volunteers if they were needed. By August 20, more than 15,300 had volunteered to serve, about 22 percent of all Air Force Reservists. Although many reservists served as volunteers throughout the war, the Department of

²²Ibid., p. 347.

²³Ibid., pp. 362-363.

Defense soon realized it needed the authority to recall portions of its reserve components to support the rapidly expanding commitment of forces in the Persian Gulf. President Bush authorized the call-up of 200,000 reservists for 90 days. Under this authority, by March 12th 23,500 Air Force Reservists were called to active duty. Of these, more than 20,000 were assigned to 215 reserve units, 2,300 were individual mobilization augmentees, and 960 were members of the individual Ready Reserve or retired reserve.²⁴

Evaluations of the effectiveness of reservists called to active duty during the Gulf War found performance was quite satisfactory. There were factors that made this conflict rather unique. At that period of time, the United States was at a state of high military preparedness, and many of the combat and support formations came from active forces deployed in Europe, which were at a point of being reduced as the Cold War wound down. There was an extended period of time during which the United States was able to build up forces. There were support infrastructures in Saudi Arabia and Turkey which were available, and the war was very short and losses were slight. A senior U.S. commander said, "Desert Storm was the perfect war with the perfect enemy. . . . We had the perfect coalition, the perfect infrastructure, and the perfect battlefield. We should be careful about the lessons we draw from the war."²⁵

Each of the Services and their reserve components had notable successes. The Army was very successful in deploying and using CS/CSS (combat support/combat service support) units. The Air Force proved the utility of its associate units, the readiness of its reserve fighter force, and its ability to integrate reserve aircraft squadrons into deployed wings. The Navy's Selected Reserve structure facilitated the call-up of medical personnel with specialized skills. The Marine Corps' ability to integrate company-sized units into its total deployed force was impressive.²⁶

Judged by most criteria, the Air Force was the best service component in accomplishing reserve mobilization and augmentation.

²⁴Ibid., p. 365.

²⁵Op. Cit., RAND, p. 40.

²⁶Ibid., p. xxxix.

Reserve units, aircrews, maintenance crews and support personnel required little to no post-mobilization training before performing their respective missions. All activated reserve flying units mobilized in 24 hours or less, and were prepared to deploy or did deploy in less than 72 hours.

There were three primary reasons for this success: First, the Air Force holds its reserve units, both Air National Guard and Air Force Reserve, to the same readiness standards expected of active units.

Second, the Air Force provides its reserve component with funds, equipment, and full-time personnel that allow for greater training opportunities than the Army does. While the Air Force provides fewer flying hours to the Air Reserve Component than to active units, it still gives the reserves relatively more training hours than the Army gives "ground miles" to its reserve units—an average reserve/active ratio of 0.64 for the Air Force and 0.29 for the Army. This difference translates directly into cost savings. Air Force reserve units are only one-third less expensive than their active counterparts, while Army reserve units are two-thirds less expensive than their active counterparts.

Third, the vast majority of Air National Guard and Air Force Reserve officers and enlisted personnel have prior active duty experience. Over the last two decades the proportion of prior service to non-prior service has shifted from 30/70 to 70/30.²⁷

NATO AND KOSOVO

The story of reserve participation is yet to be written for the U.S. participation in the NATO campaign against Yugoslavia. Certainly without the existence of the Reserve component of the U.S. military, the options for President Clinton would be greatly reduced. One newspaper reported on April 15, 1999:

The 1.5 million men and women in military reserve and National Guard units are so integrated into the missions of a scaled-back active duty force that no combat operation can go on for long without

²⁷Ibid., pp. 56–57.

their support. . . . The Defense Department's request to activate what is likely to be tens of thousands of reservists to fulfill specific combat-support and civil-affairs functions should reach the president in a matter of days. . . . More than 50 percent of all Air Force refueling is done by reserve crews, and a significant amount of airlift capacity is handled by reservists, too.²⁸

RESERVISTS AS CIVILIANS

An issue that has not yet been mentioned is what happens to a reservist's job when he is mobilized. Of course the government wants his reemployment rights to be protected. An attempt to ensure protection was made in 1994 when President Clinton signed the Uniformed Services and Reemployment Rights Act. This law rewrote previous legislation and strengthened the provisions ensuring that reservists cannot be refused hiring, denied promotion, or fired because of their military service.

To meet the Air Force's operational requirements, the Air Force has asked its personnel to volunteer for an extraordinary range of activities. Some exposed the reservists to hostile action. This degree of reliance on the willingness of reservists to respond quickly became a topic of great concern to the Air Force Reserve's senior leadership. Some theoretical limit must exist on the amount of support reserves will provide on a voluntary basis. With each additional crisis, the senior leaders' concern became more palpable.

Events, however, have not yet revealed this point. A survey conducted by the Headquarters AFRES revealed that, as of February 1995, approximately 80 percent of all reservists were willing to volunteer more time than they had in the past, although only 65 percent of aircrew personnel expressed a willingness to do more. The survey revealed that most were more willing to volunteer for short periods (one to four weeks) perhaps once or twice a year for overseas humanitarian and domestic relief missions. Most expressed

²⁸"Part-Timers Part of Equation For U.S. Military Operations," *Boston Globe*, April 15, 1999, p. 28, by Mary Leonard, Globe Staff.

concerns that longer or more frequent service might cause problems with their employers.²⁹

Even with the law supporting the reemployment rights of reservists, military leadership would prefer non-compulsory support of employers. The Department of Defense has organized the National Committee for Employer Support of the Guard and Reserve. Its statement of purpose is to work with employers, reservists, military leadership, and 54 (state) volunteer committees to build and maintain a strong base of support for the role of the National Guard and Reserve in our Nation's defense. Their material can be accessed worldwide through their Web site at <http://www.ncesgr.osd.mil>.

It is a wise man who learns from his own experiences, but it is even better if one can learn from others' experiences. Korea's military needs and experience are quite different from those of the United States. However, as a case study, the two-hundred-year experience offers many lessons for those who want to study them.

A model closer to Korea's is the Israeli Defense Forces. Both Korea and Israel are small countries with regional concerns. A very good, brief summary is given as Appendix A in a RAND publication and is abridged below.

ISRAELI DEFENSE FORCES

Purpose. The Israeli Defense Forces are structured and trained for conflict. The IDF also performs another significant function more closely related to police activities than to combat: patrolling Israeli-occupied territories.

Active/Reserve integration. Because of its small size, Israel cannot afford to depend on large standing forces. Instead, reserves account for approximately 80 percent of the IDF. The Israeli Reserve Forces are unusual among reserve forces in that they are the country's most important operational components rather than being follow-on and reinforcing forces.

²⁹Op. Cit., Cantwell, p. 382.

The basic combat formation in the Israeli army is the brigade. Some IDF reserve brigades round out active divisions and others form all-reserve brigade divisions.

Manning and training. Israel has universal military service. Males typically serve three years on active duty and unmarried females two years. After leaving active service, all males serve in the reserves until age 55.

Reserve combat units are commonly composed of people who served together on active duty and remain together throughout the lifetime of their unit. Crews perform their refresher training and annual training together for several years, learning each other's abilities and personalities.

Typical reservists serve about 45 days per year. Of these, 30 to 35 days are spent on active duty. Half of the active duty time is spent training for wartime missions and the other half on operational missions, e.g., border patrols and patrols in Israeli-occupied territories.³⁰

CONCLUSION

Military manpower represents a vast expenditure of resources for most countries. This expenditure is generally productive only during a period of armed conflict. When an all-out effort is needed, the cost of winning a conflict does not seem material. But in the absence of hostilities, expenditures on military preparedness might seem ill-used.

Korea is experiencing an economic downturn that has unmasked a number of societal problems. Use of reserve forces seems to offer a way to reduce military expenditures without damaging military capabilities while at the same time uplifting the economic well-being of the nation.

Money invested in the reserve forces can go beyond the purpose of maintaining military strength. It can raise the skill levels of the reservists which can enhance manpower resources of the nation. Reserve forces can be utilized for nonmilitary objectives of creating

³⁰Op. Cit., RAND, pp. 297-299.

and maintaining national infrastructures, and reservists can be trained to be used for meeting national emergency situations.

One of the problem/opportunity areas for Korea is the need to develop an aerospace infrastructure for the future. Korea has lagged behind some other Asian countries in developing aerospace facilities and production capacities. There is a convergence of a national need and a military need in this respect.

Korea's military planners have undoubtedly faced the difficulty of aligning what they see as military needs with what the civilian politicians see as priorities. It might well be useful to look at the experience of the U.S. military in facing the same kinds of problems.

**THE EMERGING BALLISTIC MISSILE THREAT:
GLOBAL AND REGIONAL RAMIFICATIONS**

Bruce Bennett¹

INTRODUCTION

In recent years, much has been made of the ballistic missile threat posed both in Northeast Asia and throughout the world. While China has posed a serious ballistic missile threat for many years, North Korea has received particular attention since its launch of the Taepo Dong I missile over Japan on August 31, 1998. The intelligence community in the United States had not anticipated North Korean ballistic missile capabilities even close to those demonstrated, suggesting a major intelligence failure,² the character of which was predicted only a month and a half earlier by the Rumsfeld Commission.³

¹This paper was originally presented to a conference on "Korean Air Power: Emerging Threats, Force Structure, and the Role of Air Power," sponsored by Yonsei University on June 11–12, 1999. It reflects the views of the author, and does not necessarily reflect the opinions or policies of RAND or its research sponsors. This paper was modified after the conference to clarify some points and add some additional issues, including new revelations on the Chinese and North Korean ballistic missile programs.

²"CIA Director George Tenet and Army Lieutenant General Patrick Hughes, head of the Defense Intelligence Agency, told members of the Senate Armed Services Committee Wednesday in a classified briefing that they were surprised by the DPRK's test-firing of a three-stage rocket. . . . Senator Bob Smith, R-N.H., said, 'The drift of the concern is they're more advanced than we thought they were. The performance of this thing came as a surprise.'" John Diamond, "North Korean Missile Surprised U.S.," Washington, The Associated Press, Sept. 23, 1998.

³*Executive Summary of the Report of the Commission to Assess the Ballistic Missile Threat to the United States*, July 15, 1998. A news report on the Commission explained

This Commission also predicted that within five years of a decision to acquire an ICBM capable of reaching the United States, North Korea would be able to do so. They noted that China already has such ICBMs.⁴

What are the implications of these North Korean and Chinese ballistic missile capabilities? Do North Korean ballistic missiles pose a unique threat to the Republic of Korea (ROK) and its allies? In particular, do they pose a serious threat to the ROK Air Force? Or are they but a component of the broader North Korean threat? And what should the United States and the ROK make of Chinese ballistic missile capabilities? What are the broader, global ramifications of North Korean and Chinese ballistic missile capabilities?

This chapter begins by examining the nature of the current and projected ballistic missile forces in both North Korea and China. It then characterizes the kind of damage that ballistic missiles can cause. It discusses how the ballistic missiles could be used, and what their impact might be within the Northeast Asia region. It also examines the damage that these threats could cause in the United States and other countries beyond Northeast Asia. It concludes by examining North Korean and Chinese ballistic missile-related transfers to other countries and the resulting implications of these ballistic missile threats.

these intelligence failures: "Administration officials have said that U.S. spy satellites have failed to spot or predict key developments in weapons proliferation, such as the Indian nuclear tests in May, because the countries involved have taken steps to conceal their activities from overhead surveillance by working underground, in bad weather, or at night, or by knowing the scheduled orbits of U.S. satellites." Walter Pincus, "Buried Missile Labs Foil U.S. Satellites: 'Intelligence Gaps' Include N. Korea, Iran," *Washington Post*, July 29, 1998, p. A1.

⁴*Executive Summary* Op. Cit.

THE NORTH KOREAN BALLISTIC MISSILE THREAT⁵

North Korea has placed major emphasis on the development of ballistic missiles. They are an important source of North Korean military capability, but also a vehicle for North Korea to gain badly needed foreign exchange. North Korea has been quite secretive about its ballistic missile developments, using an active cover, concealment, and deception (CCD) program to deny the United States information on the quantities and qualities of its ballistic missiles.⁶ Table 9.1 summarizes much of the information available, recognizing the broad uncertainties that occur due to the CCD program. An approximate quantity is given for each type of missile in 1999 and 2010; the estimates for 2010 assume that the current North Korean regime either continues with its existing ballistic missile programs or is replaced by a regime that maintains these programs. The circular error probable (CEP) measures the accuracy of the missiles, and is the radius around the target within which half of the warheads would land.

North Korea originally acquired a series of FROG missiles of increasing range from Russia in 1969–1970. In the 1970s, North Korea started producing its own FROGs.⁷ The FROGs are likely being replaced by 240mm MRLs and SS-21s, such that few FROGs will remain by 2010.

⁵Those interested in more information on the North Korean ballistic missile programs will find the work of the Center for Nonproliferation Studies (CNS) of interest. A part of the Monterey Institute of International Studies, CNS maintains an Internet site, "Chronology of North Korea's Missile Trade and Developments," at <http://cns.miis.edu/research/korea/chron.htm>.

⁶"North Korea, Iran, and other countries are concealing their ballistic missile programs from U.S. spy satellites by using enormous underground laboratories and factories to build and test the weapons, according to members of a bipartisan commission that has been determining the threat posed to the United States by ballistic missiles. . . . The panel chairman, former defense secretary Donald Rumsfeld, recently told the House National Security Committee that North Korea, Iran, Russia, and China "have made extensive use of the underground construction, which enables them to do things such as development and storage and, indeed, even launching from underground, hidden silo areas." The North Koreans, for example, have created 'an underground city' to hide the development of its No Dong missile, according to one panel member who has listened to extensive highly classified briefings given the commission over the last six months." Walter Pincus, *Op. Cit.*

⁷CDISS Internet site (<http://www.cdiiss.org>), "National Briefings: North Korea," March 1999.

The North Korean 240mm MRL fits with the ballistic missiles because its rockets have a 60 to 70 kilometers range,⁸ and could replace the FROG missiles. Each MRL has either 12 or 22 tubes for rockets, and it can be anticipated that multiple reloads are available for each launcher. This force will likely expand at least somewhat by 2010.

⁸The Ministry of National Defense, The Republic of Korea, *Defense White Paper, 1995–1996*, p. 61.

Table 9.1
North Korean Ballistic Missiles

Missiles	Range	Payload	CEP	Number of Missiles		Missiles per Launcher
				1999	2010	
FROG	35–70 km	450 kg	0.5–0.8 km	100–450	?	4–10
240mm MRLs	60–70 km	90 kg ^a	0.7+ km	>10,000	>10,000	60–500?
SS-21a	70 km	480 kg	0.15 km	A few?	100+?	3–10?
HQ-2 mod	80 km	130 kg	<0.5 km	100+?	<100?	3–10?
Scud B	320–340 km	1,000 kg	0.5–1.0 km	200–650	200–650	10–20
Scud C	500–550 km ^b	500–770 kg	0.5–1.0 km ^c	180–550	300–700	10–20
Scud C mod	800 km	300 kg	0.5–1.0 km?	A few?	200–300	10–20
No Dong I	1,000–1,400 km	770–1,200 kg	0.7–4 km	70–95	70–95	3–10?
No Dong II	1,500–2,200 km	700–1,000 kg	0.8–4 km	30–40	200–300	3–10?
Taepo Dong I	2,000 km	1,000 kg	1–4 km?	—	150–200	2–3?
Taepo Dong II	3,500–6,000 km	700–1,000 kg	1–4 km?	—	50–75	2–3?
ICBM	9,000–10,000 km	1,000 kg?	1–4 km?	—	25–50?	2–3?

SOURCES: Range, payload, and CEP are drawn from: "Foreword," *Jane's Strategic Weapon Systems*, Issue 21, April 1996; "Scud C Variant," "SS-21 'Scarab,'" and "No Dong-1/2," *Jane's Strategic Weapon Systems*, Issue 28, Sept. 1998; CDISS Internet site, "National Briefings: North Korea," 1999; Office of the Secretary of Defense, *Proliferation: Threat and Response*, April 1996, p. 8; Defense Intelligence Agency, *North Korea: The Foundations for Military Strength—Update 1995*, 1996, p. 21; Robert D. Walpole, National Intelligence Officer for Strategic and Nuclear Programs, "Non-Proliferation," Carnegie Endowment for International Peace; and Joseph S. Bermudez Jr., "DPRK Ballistic Missile Characteristics," April 1999. The number of missiles is discussed in the text below.

^aThe warhead size comes from Christopher F. Foss, ed., *Jane's Armour and Artillery 1993–1994*, Jane's Data Division, 1993, p. 620.

^bA Russian source gives the North Korean Scud C a range of up to 780 km with a reduced payload. See Roald V. Saveliev, "A Hypothetical North Korean Invasion Scenario and Possible Countermeasures," *Hypothetical North Korean Invasion Scenarios and Countermeasures*, RINSA, Korean National Defense University, August 1995, pp. 109–110.

^cThe Scud C should have better accuracy than the Scud B, according to Defense Intelligence Agency, *North Korea: The Foundations for Military Strength—Update 1995*, 1996, p. 21.

In 1997, North Korea reportedly imported the SS-21 missile from Syria to reverse engineer and then produce it.⁹ By 2010, North Korea could produce several hundred of these missiles, though it may export some fraction of its production (especially back to Syria).

North Korea appears to have a variant of the Chinese HQ-2 surface-to-air missiles (a copy of the Russian SA-2) that has been configured for surface-to-surface operations.¹⁰ This missile was likely derived directly from the HQ-2 rather than being upgraded like the Chinese CSS-8 (M-7).¹¹ The short range of this missile would restrict it to use from SA-2 launchers near the DMZ. North Korea might have 100 or so of these missiles.

North Korea is best known for developing its own versions of the Scud B and Scud C missiles. North Korea began Scud B production in 1985 and achieved full-scale production in late 1986. Scud B production ran between eight to twelve per month, or about 100 to 150 per year; this level of Scud B production apparently continued through 1991.¹² This would imply that North Korea produced about 600 to perhaps 900 Scud Bs by 1991.¹³ Not all the Scud Bs produced remained in North Korea. The *Korea Herald* reported that: "South Korean intelligence officials believe North Korea exported more than 250 Scud missiles to Iran, Syria, and the United Arab Emirates between 1987 and 1992."¹⁴ Another source stated: "Following the first

⁹CDISS Internet site, "National Briefings: North Korea," 1999; "Offensive Weapons (Unclassified Projects): North Korea," *Jane's Strategic Weapon Systems*, Issue 28, Sept. 1998.

¹⁰Bosnian Serbs used several SA-2s for this purpose; see Joel Brand, "U.N. Denounces Serb Firing of 4 Missiles," *Washington Post*, November 5, 1994, p. A-17. North Korea has 300+ SA-2 class launchers per International Institute of Strategic Studies, *The Military Balance 1998/99*, London, 1998, p. 186; because of the limited range of this missile, only launchers near the DMZ would likely be used for surface-to-surface launches.

¹¹North Korea and the Serbs are users of the SA-2 variant rather than the CSS-8 per "Foreword," *Jane's Strategic Weapon Systems*, Issue 21, April 1996.

¹²"North Korea: A Potential Time Bomb," *Jane's Intelligence Review*, Special Report No. 2, April 1994, p. 12. The same production rate is given by Steven J. Zaloga, "Third World Ballistic Missiles," *World Missiles Briefing*, Teal Group, August 1998, p. 3.

¹³North Korea produced 553 Scud Bs through 1994 according to Forecast International, "NoDong-1," *World Missile Forecast*, Section D, Feb. 1994.

¹⁴Sung-Yul Lee, "North Korean Operates at Least 4 Missile Factories, 10 Launch Sites, Official Says," *Korea Herald*, March 26, 1999.

shipment of 100 North Korean Scud B SRBMs in 1988, a further 200 to 300 missiles were delivered, and by the early 1990s it was estimated that Iran had accumulated up to 350 Scud Bs, together with some 15 mobile launchers.¹⁵ If 250 to 400 Scud Bs were exported in this period, then North Korea would have had some 200 (600 minus 400) to 650 (900 minus 250) Scud Bs remaining in 1991/1992. Another estimate puts North Korean Scud Bs at only 120 with Scud Cs at 180, but then says an alternate estimate of combined Scuds was 500 in 1995¹⁶ (which would likely grow close to 700 in 1999). In light of these varying estimates, 200 seems to be a reasonable lower estimate of Scud Bs. North Korea appears to have produced some Scud B knock-down kits after 1991 for export and assembly at foreign production plants,¹⁷ but likely shifted most of its production to Scud Cs. Thus, 200 to 650 North Korean Scud Bs is both the current estimate and the estimate for 2010.

North Korea first produced the Scud C in 1989, with full scale production being reached in late 1991, and according to many sources, that production has run four to eight units per month, or 50 to 100 Scud Cs per year.¹⁸ Alternatively, the South Korean Ministry of National Defense said in the mid-1990s that North Korea "... is currently estimated to possess the production capability of no fewer than 100 Scud B/C missiles per year."¹⁹ Another source claimed that

¹⁵CDISS Internet site, "Iran," March 1999. The 1988 shipment was 120 according to "Offensive Weapons (Unclassified Projects), Iran," *Jane's Strategic Weapon Systems*, Issue 28, Sept. 1998.

¹⁶CDISS Internet site, "North Korea," March 1999.

¹⁷North Korea exported 180 Scud Bs and Scud Cs for assembly and manufacture in Syria from 1993 to 1998 according to "Offensive Weapons (Unclassified Projects), Syria," *Jane's Strategic Weapon Systems*, Issue 28, Sept. 1998. Syria apparently assembled most of these from knockdown kits. It is not known how many of these were Scud Bs, but some Scud Bs were exported from 1993 on.

¹⁸*Jane's Intelligence Review*, Op. Cit., p. 13. Similar production rates are given in Defense Intelligence Agency, *North Korea: The Foundations for Military Strength—Update* 1995, 1996, p. 21; Office of the Secretary of Defense, *Proliferation: Threat and Response*, November 1997, p. 8.

¹⁹The Ministry of National Defense, The Republic of Korea, *Defense White Paper* 1995–1996, p. 61. The *White Paper* of the previous year described Scud production as at least 100 to 150 missiles per year (on p. 71). A production capacity of 100 Scud Bs and Scud Cs is given in "Weekly Notes," *Washington Times*, Sept. 27, 1996, p. 18.

363 Scud Cs were produced through 1994,²⁰ or about 100 per year. Scud C production likely phased down as No Dong production was increased and work went into a longer-range Scud variant (see below), leading to reduced Scud C production after 1997 of perhaps 20 to 30 per year through perhaps 2005. We conclude therefore that perhaps 350 to 750 Scud Cs have been produced by 1999, with something closer to the higher number more likely. North Korea has transferred both complete Scud Cs and Scud C knockdown kits to Iran and to Syria for their assembly; it appears that 150 to 220 went to Iran,²¹ and 50 to 80 went to Syria,²² for a total of 200 to 300. Thus North Korea might have had as few as 50 (350 minus 300) or as many as 550 (750 minus 200) Scud Cs remaining. Various sources suggest that North Korea has between 180 and 200 Scud Cs,²³ which gives a more reasonable lower estimate than 50. If 20 to 30 Scud Cs are produced annually through 2005, then North Korea's total Scud C inventory in 2010 would be about 300 to 700.

From these numbers, we estimate that in 1999 North Korea has between 380 and 1,200 Scud Bs and Scud Cs. This range seems consistent with the 1997 DoD statement that, "Pyongyang has hundreds of Scuds in its inventory and available for use by its missile forces."²⁴

Jane's also indicates that, "Unconfirmed reports in 1997 suggest that a longer range version of the 'Scud C' variant is being developed, with the payload reduced to 300 kg and the range increased to 800

²⁰See Forecast International, "NoDong-1," *World Missile Forecast*, Section D, Feb. 1994.

²¹Iran received 100 to 170 Scud Cs between 1991 and 1994 according to CDISS Internet site, "Iran," March 1999. Subsequent Iranian production was likely at least at the lower end of this rate (25 per year), using at least some materials from North Korea. The total transfer was probably equivalent to 150 to 220 Scud Cs. Alternatively, North Korean sent 170 Scud Cs to Iran according to "Offensive Weapons (Unclassified Projects), Iran," *Jane's Strategic Weapon Systems*, Issue 28, Sept. 1998.

²²In 1995, Syria had 60 Scud Cs according to "Offensive Weapons (Unclassified Projects), Syria," *Jane's Strategic Weapon Systems*, Issue 28, Sept. 1998. Syria has 50 to 80 Scud Cs according to Anthony H. Cordesmann, *Weapons of Mass Destruction in the Middle East*, CSIS, March 1999, p. 23.

²³The estimate of 180 is in CDISS Internet site, "North Korea," March 1999, while 200 is in "Scud C Variant," *Jane's Strategic Weapon Systems*, Issue 28, September 1998.

²⁴Office of the Secretary of Defense, *Proliferation: Threat and Response*, April 1997, p. 8.

km.”²⁵ We assume that only a few of these might exist in 1999, but that North Korea might produce 200 to 300 of them by 2010, with few exports.

North Korea initially tested the No Dong I missile from 1990 to 1993. “In December 1994 reports indicated that six TELs and between 12 and 18 No Dong-I missiles were in service in North Korea, and that full scale production would start during 1995 with between 30 and 40 missiles being built a year. However, in 1995, further reports suggested that technical problems and U.S. diplomatic pressure had halted the No Dong-I programme. . . .²⁶ Still, it is reported that in 1996, North Korea exported approximately 12 No Dongs to Iran, and in 1997 exported another 10 to 12 No Dongs to Pakistan.²⁷ This implies that North Korea was apparently producing at least 12 No Dongs per year from 1995 on, and most likely something closer to the anticipated production levels. The No Dong II apparently entered service around 1998.²⁸ Added to the No Dongs in 1994, three years (1995 to 1997) of production provided a total of 100 to 140 No Dong Is, 70 to 95 of which are still available after exports and tests, and that North Korea has perhaps 30 to 40 No Dong IIs available in 1999. These numbers are consistent with a recent report that more than 10 No Dongs are installed on launchers and ready for launch (with other No Dong reloads in storage).²⁹ No Dong II production will likely continue through 2000, and then half of it will probably be directed into Taepo Dong I production (see below). Thus, by 2010, North Korea might have about 200 to 300 No Dong IIs based upon almost ten years of the lower level of production.

North Korea tested the Taepo Dong I missile in August 1998. According to the Rumsfeld Commission, North Korea has made

²⁵“Scud C Variant,” *Jane's Strategic Weapon Systems*, Issue 28, September 1998.

²⁶“NoDong-1/2 (Labour 1/2),” *Jane's Strategic Weapon Systems*, Issue 22, September 1996.

²⁷“Shahab 3/4” and “Hatf 5/6 (Ghauri/Ghaznavi),” *Jane's Strategic Weapon Systems*, Issue 28, September 1998.

²⁸“NoDong-1/2,” *Jane's Strategic Weapon Systems*, Issue 28, September 1998.

²⁹“U.S. Satellite Spots N.K. No Dong Missiles,” *Chosun Ilbo* Internet site, March 28, 1999.

missiles like this operational soon after even one test,³⁰ making operational status likely in 1999 or 2000. Because the Taepo Dong I is apparently a No Dong I first stage and a Scud second stage, we anticipate that perhaps 15 to 20 will be produced per year, or roughly 150 to 200 by 2010. The Taepo Dong II is projected as being in service by as early as 2004,³¹ and at a somewhat lower production rate of 10 to 15 per year might provide 50 to 75 missiles by 2010. The Taepo Dong II is reported to consist of a first stage that is very similar to the Chinese CSS-3 first stage, and may thus reflect Chinese proliferation of missile technology directly to North Korea.³²

Finally, there is much discussion of a possible future North Korean ICBM, but such a missile has not yet been identified by name. Nevertheless, the Rumsfeld Commission concluded that it could be available within five years of an effort to start its production,³³ which suggests an initial operational capability by perhaps 2005. If North Korea will be able to produce 5 to 10 such missiles per year, it might have 25 to 50 by 2010.

Warheads. The North Korean ballistic missiles of the Scud size or larger are generally perceived to carry either high explosive (HE) or chemical weapon (CW) warheads. These warheads may be either unitary (a single HE or CW warhead) or submunitions (dozens to hundreds of smaller warheads carrying HE or CW that are spread over a large area). The North Korean ballistic missiles of the No Dong size or larger are also assumed to have the potential for carrying nuclear warheads. While there appears to be no discussion of biological warheads on existing North Korean ballistic missiles, the availability of submunitions on these missiles is a step toward biological payloads (which can achieve their full destructive potential

³⁰Executive Summary of the Report of the Commission to Assess the Ballistic Missile Threat to the United States, July 15, 1998.

³¹"Offensive Weapons (Unclassified Projects), North Korea," *Jane's Strategic Weapon Systems*, Issue 28, Sept. 1998. More recent estimates suggest that the TaepoDong II could be tested much earlier, perhaps in late-1999.

³²"Sources' Say DPRK Missile Similar to Chinese Missile," *Seoul Yonhap in English*, July 20, 1999.

³³Executive Summary of the Report of the Commission to Assess the Ballistic Missile Threat to the United States, July 15, 1998.

only when delivered by submunition). It is possible that North Korea will have such payloads by 2010.

It is generally perceived that a No Dong-delivered North Korean nuclear warhead (of 700 to 1,000 kgs) would be a first generation nuclear device of roughly 10 to 20 kilotons (Kt) yield, comparable to the early U.S. atomic bombs. By comparison, early-1990s technology Chinese theater ballistic missiles with comparable warhead weights (500 to 1,000 kgs) are believed to carry nuclear warheads of 90 Kt to 250 Kt yield, about 10 times as much. Typical U.S. ICBM or SLBM warheads apparently are about 275 kgs to 400 kgs (half the weight of these Chinese missile payloads) and have nuclear yields up to 500 Kt.³⁴ Thus North Korean nuclear weapons could become far more potent if North Korea is able to exploit Chinese or especially U.S. nuclear weapon technology.

Recent news reports indicate that China appears to be providing North Korea the means to improve its ballistic missile accuracy. "According to Pentagon intelligence officials, a DIA report said the Chinese technology sold to the North Korean missile program includes accelerometers, gyroscopes, and special high-technology machinery. Accelerometers and gyroscopes are key missile-guidance components. . . ."³⁵ North Korea would need guidance packages more capable than those of a basic Scud to achieve the CEPs in Table 9.1 for its longer-range missiles.

Reliability. No specific information is available in open sources on the reliability of North Korean ballistic missiles, though many sources argue that reliability is likely low because of the very limited flight testing. Historically, U.S. and Soviet ICBMs were considered to have launch reliabilities of about 85 percent or less; by comparison, one would expect North Korean ballistic missile reliability to be perhaps 50 to 70 percent, much less than U.S. and Soviet ICBMs because

³⁴The Peacekeeper carries 10 warheads of roughly 2,750 kgs total weight which are 500 Kt each. The Trident C-4 carries 8 warheads in a throw weight of 2,800 kgs, each warhead being 475 Kt. See "LGM-118 Peacekeeper," and "UGM-133 Trident D-5" in *Jane's Strategic Weapon Systems*, Issue 29, Jan. 1999.

³⁵Bill Gertz, "Chinese Companies Sent Missile Parts to N. Korea," *Washington Times*, July 20, 1999, p. 1. This article also says that China has provided North Korea with specialty steel for its ballistic missile programs; such steel would make longer-range missiles possible.

of the more restricted testing program. Of those missiles that prove unreliable and fail to launch, some fraction will be repaired and fired later. But some unreliable missiles will misfire and destroy both themselves and their launcher. In the end, perhaps 60 to 80 percent of North Korean missiles will prove reliable after multiple launch attempts.

Defense Avoidance. There are many ways that North Korea could avoid or otherwise defeat U.S. and allied ballistic missile defenses, including decoys, multiple warheads (e.g., submunitions), and maneuvering (either to avoid interceptors or to improve accuracy). In an article on the difficulties of ballistic missile defense,³⁶ Richard Garwin talks about adversaries putting hundreds of submunitions on a ballistic missile, and (especially for biological weapon delivery) releasing the submunitions shortly after the end of the ballistic missile boost phase. Such early release would present active defenses with hundreds of targets per missile as opposed to a single warhead, giving the active defenses more targets than they can deal with. The employment of multiple warheads is a particularly interesting alternative because of the incentives to use submunitions to achieve good weapon coverage, as well.

For larger warheads such as those North Korea or China might use for nuclear weapons, Garwin argues that North Korea could surround the warheads with balloons that would hide the warhead location from active defenses designed to precisely hit the warhead to kill it.

Little is written in open sources about North Korean efforts to employ these capabilities, except for North Korean work on submunitions. It is certainly possible that North Korea could deploy various capabilities by 2010.

³⁶Richard L. Garwin, "Effectiveness of Proposed National Missile Defense Against ICBMs from North Korea," March 17, 1999.

THE CHINESE BALLISTIC MISSILE THREAT³⁷

China received IRBMs from Russia in the late 1950s, and by the mid-1960s had reversed engineered them and produced their first missile, the CSS-1. This was followed by a series of missiles that had almost exclusively a nuclear weapon role, including an ICBM that entered service in the early 1980s. Eventually, China also added high explosive, submunition, and chemical warheads primarily to its shorter-range missiles. While the Chinese nuclear warhead missile force is generally believed to be deployed in small numbers (only a few dozen of each of the longer-range missiles), the Chinese have also employed a significant CCD program to deny knowledge of the quantities and qualities of their missiles. Some sources suggest a far more extensive Chinese missile force exists,³⁸ with perhaps the smaller numbers reflecting how many launchers (mainly mobile but also some silos) have been deployed rather than the number of missiles.

Table 9.2 describes the nuclear component of the Chinese force, making some approximations on quantities, especially for 2010. In this table, it is assumed that China will maintain roughly constant numbers of its nuclear missiles, with the CSS-5 replacing the CSS-2, the CSS-9 replacing the CSS-3, and the CSS-10 replacing the CSS-4. Naturally, China could also choose to substantially expand any part or all of this force. An expansion could be justified by the lower weapon yields of the replacement missiles (e.g., a 250 Kt CSS-10 replacing a 4 to 5 megaton (Mt) CSS-4). Note that while the CSS-5 is reported to have a 0.7 km CEP today, China is working on achieving something on the order of a 50 m CEP with this missile.

³⁷The research behind this chapter placed the most emphasis on the North Korean ballistic missile threats. This compilation of the Chinese ballistic missile forces was done more quickly and with less detail.

³⁸"Finally, an unofficial analysis prepared by a Singapore university student using what is purported to be internal Chinese Defense Ministry information, claims that China has a total of 2,350 nuclear warheads. According to this source, there are 1,800 strategic weapons and 550 tactical weapons, including 120–150 DF/5 ICBMs (compared to the four cited in the *Nuclear Weapons Databook*, the 4–10 cited by *Arms Control Today*, and the 17–20 DF-5/5As cited in recent U.S. reports)." CDISS Internet site, "Size of China's Ballistic Missile Force," March 1999.

Table 9.2
Chinese Ballistic Missiles with Nuclear Payloads

Missiles	Range	Basic	Miniatur.	CEP	Number of Msls		Msls./ Launcher
		Payload	Payloads		1999	2010	
CSS-7 (DF-11/M-11)	280–300 km	90 Kt	4x200 Kt	0.6 km	40–60	40–60	2–6
CSS-6 (DF-15/M-9)	600 km	90 Kt	4x200 Kt	0.3 km	80–120	80–120	2–5
CSS-5 (DF-21)	1,800–2,500 km	250 Kt	3x200 Kt	0.7 km →0.05 km	40–60	80–120	2–3
JL-1 (SLBM)	2,150 km	250 Kt	3x200 Kt	0.7 km	14–20	14–20	1+
CSS-2 (DF-3)	2,650 km	1–3 Mt	—	2 km	15–25	—	1–5
CSS-2 (DF-3A)	2,800 km	1–3+ Mt	—	1 km	25–35	—	1–5
CSS-3 (DF-4)	4,750–5,500+ km	2 Mt	—	1.5 km	20–35	—	1–3
CSS-9 (DF-31)	8,000 km	250 Kt or 3x50–90 Kt	4x200 Kt	<0.5 km?	—	—	1–3
JL-2 (SLBM)	8,000 km	250 Kt	4x200 Kt	<0.5 km?	—	32–48	1+
CSS-10 (DF-41)	12,000 km	250 Kt or 3x50–90 Kt	4x200 Kt	<0.5 km?	—	60–120?	1–5
CSS-4 (DF-5)	11,000–13,000 km	4–5 Mt	—	0.5–0.8 km	20–150	Some	1–5

SOURCES: "Foreword," *Jane's Strategic Weapon Systems*, Issue 21, April 1996; "CSS-2," "CSS-3," "CSS-4," "CSS-5," "CSS-6," "CSS-7," "CSS-X-9," and "CSS-X-10," *Jane's Strategic Weapon Systems*, Issue 28, Sept. 1998; CIISS Internet site, "National Briefings: China," 1999; and Office of the Secretary of Defense, *Proliferation: Threat and Response*, April 1996, p. 8.

The quantity of the CSS-10s was adjusted up from the open literature sources based upon a statement by LTG Patrick Hughes, Director of the U.S. Defense Intelligence Agency. LTG Hughes indicated that: "China's strategic nuclear force is small and dated, and because of this, Beijing's top military priority is to strengthen and modernize its strategic nuclear deterrent. Numerous new missile systems are under development, along with upgrade programs for existing missiles, and for associated command, control, communications and other related strategic force capabilities. While the pace and extent of China's strategic modernization clearly indicates deterrent rather than 'first strike' intentions, the number of Chinese strategic missiles

capable of hitting the United States will increase significantly during the next two decades.”³⁹

The basic nuclear weapon yields shown in Table 9.2 appear to be based on relatively old nuclear weapon designs. It has been argued that Chinese spies collected information on U.S. nuclear warhead designs in order to produce greater warhead yields with smaller weights.⁴⁰ While denying that it stole these designs, China has stated that it has mastered some of the warhead designs,⁴¹ leading to the possibility of the miniaturized payloads shown in Table 9.2.⁴²

Table 9.3 estimates the characteristics of the nonnuclear component of the Chinese ballistic missile force. Chinese military analysis of the Persian Gulf War concluded that ballistic missiles armed with high explosive warheads had significant value, leading to a decision to arm some of its CSS-5s with high explosive warheads.⁴³ As a result, China has today a modest number of The quantity of the CSS-10s was adjusted up from the open literature sources based upon a statement by LTG Patrick Hughes, Director of nonnuclear ballistic

³⁹LTG Patrick M. Hughes, “Global Threats and Challenges: The Decades Ahead,” Prepared Statement before the Senate Armed Services Committee, Feb. 2, 1999, available at Internet site <http://www.defenselink.mil/speeches/1999/s19990202-hughes.html>.

⁴⁰See, for example, Jerry Seper and Bill Gertz, “FBI Probes New leads in China Spying,” *The Washington Times*, March 18, 1999.

⁴¹“Among the disclosures China made was that it has developed a neutron bomb. . . .” Marcus W. Brauchli, “China Rebuts U.S. Allegations of Atomic-Weapons Espionage,” *Wall Street Journal*, July 16, 1999. “. . . China declared it had mastered the technology to manufacture a neutron bomb and miniaturize nuclear weapons.” John Pomfret, “China Ponders New Rules of ‘Unrestricted War,’” *Washington Post*, August 8, 1999, p. 1. “Miniaturized” nuclear warheads are designed to cause high efficiency nuclear explosions, making it possible for a single missile to carry a number of moderate-size warheads rather than just a single one.

⁴²Various articles describe the Chinese efforts to steal the W-88 warhead technology. See, for example, James Risen and Jeff Gerth, “U.S. Says Suspect Put Data on Bombs in Unsecure Files,” *New York Times*, April 28, 1999, p. 1. The Trident D-5 missile uses 8 W-88 warheads in a throwweight of 2,800 kgs, or about 350 kgs each (ignoring the weight of the MIRV bus. . . .), with a 475 Kt yield, or about 1.36 Kt per kg. See “UGM-133 Trident D-5,” *Jane's Strategic Weapon Systems*, Issue 29, Jan. 1999. To be conservative, the numbers for miniaturized warheads in Table 2 assume that enhanced Chinese warheads would be about 1.0 Kt per kg, and that warheads would be 200 Kt in size; thus, larger payloads would have more warheads.

⁴³CDISS Internet site, “National Briefings: China,” March 1999.

Table 9.3
Chinese Ballistic Missiles with Nonnuclear Payloads

Missiles	Range	Payload	CEP	Number of Missiles		Msls/ Lnchr
				1999	2010	
CSS-8 (M-7)	150–160 km	190 kg	<0.3 km?	100–500	100–500	2–5
CSS-7 (DF-11/ M-11)	280–300 km	800 kg	0.6 km	0–150	100–300	2–5
CSS-6 (DF-15/ M-9)	600 km	500–950 kg	0.3 km	100–300	300–500	2–5
M-18	1,000 km	400 kg	<0.5 km?	—	0–300	2–5
CSS-5 (DF-21)	1,800–2,500 km	500–600 kg	0.7 km →0.05 km	30–70	100–500	2–5
CSS-2 (DF-3)	2,650 km	2,150 kg	2 km	20–80	—	1–5
CSS-2 (DF-3A)	2,800 km	2,150 kg	1 km	30–70	—	1–5

SOURCES: “Foreword,” *Jane’s Strategic Weapon Systems*, Issue 21, April 1996; “CSS-2,” “CSS-5,” “CSS-6,” “CSS-7,” and “CSS-8,” *Jane’s Strategic Weapon Systems*, Issue 28, Sept. 1998; CDISS Internet site, “National Briefings: China,” 1999; and Office of the Secretary of Defense, *Proliferation: Threat and Response*, April 1996, p. 8.

missiles, but will likely have a significant number in the future. “One recent long-range study by the U.S. Department of Defense examined the possibility of a massive missile build-up by China, including its short-range, tactical missile force. This study reportedly estimated that the Chinese would have 500 DF-15/M-9 SRBMs by 2010, and as many as 2,000 conventionally armed ballistic missiles of varying ranges by 2010.”⁴⁴ These numbers were used to determine the magnitude of the high-end estimates in Table 9.3. The above-cited material by LTG Hughes also says that, “I expect the numbers of ballistic missiles with ranges between 300–3,000 kilometers to increase four-to-five fold during the next 20 years and to become more accurate and destructive.”⁴⁵ Presumably much of this increase would be in nonnuclear payload missiles, making the high estimates of Table 9.3 relatively likely.

⁴⁴CDISS Internet site, “Size of China’s Ballistic Missile Force,” March 1999.

⁴⁵LTG Patrick M. Hughes, Op. Cit.

CHARACTERIZING BALLISTIC MISSILE THREATS⁴⁶

Ballistic missiles offer a country the opportunity to rapidly attack targets at some distance. Unless the targeted country has very expensive ballistic missile defenses (and in some cases even if it does), a reliable ballistic missile will reach its target area and cause some damage. For North Korea, whose air forces are largely antiquated and poorly trained,⁴⁷ ballistic missiles are one of the few options for attacking ROK air forces at their air bases where they are most vulnerable. Ballistic missiles could also be used to attack other targets, including ports and cities.

The damage that ballistic missiles cause is a function of the target type and size, the payload of the missile (both the type of warhead and its size), and the accuracy with which the warhead is delivered. Ballistic missiles could be launched at a city or an airfield, or, with more accuracy, at individual targets in a city or on an airfield.

Many targets in a city or on an airfield are small and relatively vulnerable to damage ("soft"). Table 9.4 uses a simple formula⁴⁸ to es-

⁴⁶The calculations done in this section are simple procedures to roughly approximate the damage that ballistic missiles could do. The objective is to provide damage estimates rather than precise analysis.

⁴⁷It is generally perceived that most North Korean aircraft seeking to attack ROK airfields would be shot down: the ROK and U.S. aircraft are far newer and more capable than almost all of the North Korean aircraft. The North Korean pilots also have little training compared to CFC (about 30 flight hours per year versus 230 for the United States according to The International Institute for Strategic Studies, *The Military Balance 1998/99*, October 1998, pp. 25, 186).

⁴⁸The lethal areas used here are derived from Defense Intelligence Agency, *North Korea: The Foundations for Military Strength—Update 1995*, 1996, p. 21. A Scud (1,000 kg) unitary warhead is shown to have a 400 ft lethal diameter, and a submunition warhead has a 1,200 ft lethal diameter. Given the damage radii (DR, converted from diameters in feet to radii in meters), the probability of damage (PD) being caused by a delivered warhead is:

$$PD = 1 - 0.5 \left(\frac{DR}{CEP} \right)^2$$

To account for the target radius (TR) of 100 m, this table uses an approximation for damage which combines the TR and the CEP into an adjusted CEP:

$$CEP_a = \sqrt{CEP^2 + 0.231 * TR^2}$$

Table 9.4
Damage to Soft, Small Area^a Targets from HE Warheads on
Delivered Missiles

Accuracy	CEP (km)	Warhead Type, HE Weight				
		Submunition 1,000 kg	Unitary 1,000 kg	Unitary 500 kg	Unitary 200 kg	Unitary 50 kg
Excellent	0.05	99.2%	41.7%	28.8%	16.8%	7.1%
Better	0.1	85.0%	19.0%	12.4%	7.0%	2.8%
Good	0.25	30.2%	3.9%	2.5%	1.4%	0.5%
Fair	0.5	8.8%	1.0%	0.6%	0.4%	0.1%
Poor	1.0	2.3%	0.3%	0.2%	0.1%	0.0%
Very Poor	2.0	0.6%	0.1%	0.0%	0.0%	0.0%

^aThese calculations reflect damage to an area of 100 m radius at an airfield.

estimate the damage that could be caused to a soft, small area target (like a building, hangar, or an aircraft) by a ballistic missile with differing payloads and accuracy. A submunition warhead spreads many smaller munitions over a broader area than a unitary (single burst) warhead, and thereby may achieve greater damage if the smaller munitions are sufficiently lethal. The numbers in Table 9.4 are for delivered warheads. The delivery probability discussed above (50 to 70 percent) must be multiplied times the probabilities in Table 9.4 to calculate the damage probability of a missile to be launched at a target. Today, North Korean and Chinese ballistic missiles have “fair” to “very poor” accuracies; until they achieve at least “good” if not “better” accuracy, they have too low a probability of damaging soft, small area targets, and thus are inappropriate for attacks on such targets.

Alternatively, ballistic missiles might be targeted to do damage to any part of a large area target like a city or an airfield.⁴⁹ As the calcula-

See Defense Intelligence Agency, *Mathematical Background and Programming Aids for the Physical Vulnerability System for Nuclear Weapons*, DI-550-27-74, November 1, 1974, pp. 24–26.

⁴⁹The numbers in Table 9.5 were calculated with very rough approximations. A chemical warhead is shown in the DIA source as covering a 2.5 mi x 0.3 mi area (causing casualties, not damaging equipment or infrastructure).

tions at the top of Table 9.5 suggest, ballistic missiles cause damage over only a relatively modest area with unitary HE warheads; a large submunition warhead or the 22 rockets of a 240mm MRL (each with a 50 kg warhead) do somewhat better. A CW warhead covers a far larger area, but still only a fraction of an airfield, and that fraction can be significantly reduced at typical ballistic missile warhead accuracies. The casualty figures in Table 9.5 assume that about half of the people in the specified damage area would be casualties, and assume the average Seoul density of about 25,000 people per square kilometer in the year 2000.⁵⁰ The values in Table 9.5 suggest that HE warheads would primarily cause disruption at an airfield except for an occasional "lucky hit."

Table 9.6 shows the potential impact of nuclear warheads on cities or airfields. Nuclear weapons substantially increase the area of damage against soft targets, and even against harder targets (like bunkers and aircraft shelters). A large nuclear weapon (5 Mt) detonated in Seoul could kill or injure millions of people, whereas a small Chinese nuclear weapon (50 Kt) could cause about 250,000 casualties, and a nu-

Table 9.5

Damaging Soft Targets in a City or on an Airfield with a Delivered Missile

	Warhead Type, CW or HE Weight					
	CW 700 kg	Submunition 1,000 kg	Unitary 1,000 kg	Unitary 500 kg	Unitary 200 kg	Unitary 50 kg
Damage area (km ²)	1.95	0.106	0.012	0.007	0.004	0.035
Casualties in Seoul	24,430	1,321	147	93	50	439
Percent of airfield	24%	1.3%	0.15%	0.09%	0.05%	0.44%
CEP Accuracy (km)	Expected Percentage of Airfield Area Damaged					
Excellent 0.05	24%	1.3%	0.15%	0.09%	0.05%	0.44%
Better 0.1	24%	1.3%	0.15%	0.09%	0.05%	0.44%
Good 0.25	23%	1.3%	0.15%	0.09%	0.05%	0.44%
Fair 0.5	18%	1.1%	0.12%	0.08%	0.04%	0.36%
Poor 1.0	9%	0.5%	0.06%	0.04%	0.02%	0.18%
Very Poor 2.0	3%	0.2%	0.02%	0.01%	0.01%	0.06%

⁵⁰Mark S. Hoffman, ed., *The World Almanac and Book of Facts*, 1993, World Almanac, 1992, p. 818.

Table 9.6
Damaging Cities and Airfields with Nuclear Warheads
on a Delivered Missile

	Hard Target (50 psi)					Soft Target (5 psi)				
	5 Mt	1 Mt	250 Kt	50 Kt	10 Kt	5 Mt	1 Mt	250 Kt	50 Kt	10 Kt
Damage area (km ²)	21.5	7.3	2.9	1.0	0.3	314.0	107.4	42.6	14.6	5.0
Casualties in Seoul (1,000s)	—	—	—	—	—	5,500	1,900	533	250	85
Accuracy	CEP (km)	Expected Percent of Airfield Area Damaged								
Excellent	0.05	99%	83%	51%	21%	8%	100%	100%	100%	97% 70%
Better	0.1	99%	83%	50%	21%	8%	100%	100%	100%	97% 69%
Good	0.25	99%	81%	48%	20%	7%	100%	100%	100%	96% 67%
Fair	0.5	98%	75%	43%	17%	6%	100%	100%	100%	94% 61%
Poor	1.0	92%	57%	29%	11%	4%	100%	100%	99%	81% 44%
Very Poor	2.0	62%	28%	12%	4%	2%	100%	99%	85%	48% 20%

Source for nuclear effects: Samuel Gladstone and Philip J. Dolan, ed., *The Effects of Nuclear Weapons*, U.S. Department of Defense and Department of Energy, 1997, pp. 113–115, assuming a 400 ft. scaled height of burst in each case, and a 2 km target radius.

clear weapon of the likely North Korean size (10 Kt) could still cause perhaps 85,000 casualties if detonated in Seoul.⁵¹ Chinese nuclear warheads delivered by ballistic missiles would be sufficient to destroy the soft targets across an airfield, while even North Korean nuclear weapons with poor accuracy could cause a lot of damage to the soft targets at an airfield. While large Chinese nuclear warheads would seriously damage hard targets at an airfield (like aircraft shelters), North Korean and smaller Chinese nuclear warheads will do only moderate damage to these hard targets.

We are not concerned just about how an individual weapon would affect an individual target. Indeed, the threat turns more on the aggregate ability of North Korean or Chinese ballistic missiles to affect

⁵¹In estimating casualties, we have used the assumption that about 70 percent of the people within the nuclear damage area would be casualties. This is likely a low estimate for nuclear weapons, providing a lower bound of casualties.

broad target sets such as airfields, ports, command/control facilities, and cities in a given country. During the Cold War, analysis of the U.S. and Soviet strategic missile systems examined the ability of each country to broadly destroy the military and civilian infrastructure of the other with thousands of strategic nuclear warheads. But neither North Korea nor China have or apparently plan large nuclear forces with such devastating capabilities. Rather, the threats these countries pose would be more focused and limited, pointed at a few target classes and aimed at damaging primarily the major targets in each class. But as the analysis below suggests, even these more limited threats would be significant.

To simplify our assessment of the threats posed both within the region and globally, we will focus the analysis below on the ability of North Korea or China to damage key airfields and major urban areas in countries that they may wish to coerce or otherwise affect. This is not to imply that North Korea or China would avoid targeting other facilities like ports, but rather to give a sense of the rough damage potential of North Korean and Chinese ballistic missile forces. Table 9.7 shows basic data on urban areas and airfields for various countries that North Korea or China might consider targeting. The urban area information in Table 9.7 is projected year 2000 population for metropolitan areas as opposed to arbitrarily defined cities; thus Seoul includes many adjoining cities that make up the greater Seoul urban area. Table 9.7 also indicates the rough range (distance) of these targeted countries from selected launch locations in North Korea and China; these distances suggest which missiles could be used in attacks against each country. The launch locations are chosen as close as possible to the country in question. For example, a Scud located near the DMZ can cover all of the ROK (including ChejuDo Island) with a 550 km range (as shown in the table). Naturally, a ballistic missile located near the northeastern Chinese border would require roughly a 1,000 km range to cover all of the ROK, but missiles need not be deployed that far away from the ROK. Thus, in grouping missiles, the ranges in Table 9.7 are treated as minimums.

In evaluating the overall capability of ballistic missile forces to damage a target category, we have used a metric referred to here as "coverage." Coverage adds up the damage fractions shown in Table 9.5 and 9.6 for each missile (combining missile quantity and quality,

Table 9.7
Potential Ballistic Missile Targets

Region/ Country	Major Airfields	Major Cities			Distance (km) from	
		Names	People (1,000s)	Area (km ²)	North Korea	China
Northeast Asia						
ROK	23	Seoul, Pusan, Taegu	32,727	1,232	20–550	340–810
Japan	36	Tokyo, Osaka, Nagoya	49,561	4,896	550–1,300	820–1,300
Taiwan	19	Taipei	8,516	357	1,500–1,870	220–400
South Asia						
India	61	Bombay, Calcutta, Delhi, Madras, Bangalor	55,442	1,571	3,800–6,000	0–2,600
Europe						
FRG	90	Berlin, Essen	10,245	2,532	7,700–8,500	4,900–5,500
UK	38	London, Manchester	12,401	3,187	8,000–8,900	5,700–6,300
France	40	Paris	8,803	1,118	8,400–9,400	5,400–6,400
Russia	294	Moscow, St. Petersburg	15,859	1,341	20–6,900	0–4,300
North America						
U.S.	388	Los Ang, Chicago, San Fran, Detroit New York, Miami, Dallas, Wash DC, Boston, Houston	24,231 29,642	7,166 8,054	4,800–10,000 10,000–11,900	4,300– 10,000 10,000– 11,400

Airfield source: Central Intelligence Agency, *World Factbook 1994*, 1994. Airfields counted are those with runways over 2,440 meters (8,000 feet) in length.

Population/area source: Mark S. Hoffman, ed., *The World Almanac and Book of Facts*, 1993, World Almanac, 1992, pp. 818 (population for the year 2000).

and including missile reliability), roughly indicating how many times the ballistic missiles could “cover” or cause damage to the indicated targets. For example, a coverage value of 200 percent against the ROK airfields would indicate that North Korea could cover all 23 ROK airfields identified in Table 9.7 two times. This is a very approximate statistic: even for 100 percent coverage, ballistic missile inaccuracy could cause some coverage to overlap while leaving other areas undamaged. The targeting objective with nuclear and high explosive

weapons is usually damage to the target and the people located there; the targeting objective with chemical weapons is damage to the people but also area denial by leaving persistent contamination behind on the target. Nuclear weapons need only damage a target once, and thus coverage of more than 100 percent suggests that only a fraction of the weapons need be used against the targets indicated. However, chemical weapons do not destroy facilities, and high explosives usually damage only parts of facilities, so both of these kinds of weapons may need to be used more than once especially if the target area is reoccupied and returned to use. To assess the area denial capability of chemical weapons, we must recognize that they persist on a target for varying lengths of time depending upon the chemical and the time of year. For example, a persistent chemical like VX would have to be replaced roughly every week in Korea during the summer, so 400 percent coverage would be required to keep all airfields contaminated for roughly a month. The attacker would also need more than 100 percent coverage to offset the missile losses that it might suffer to active defenses.

THE THREAT IN THE NORTHEAST ASIA REGION

Within Northeast Asia, most North Korean ballistic missiles are likely targeted against the ROK. North Korea's very short-range missiles (the FROGs, 240mm MRLs, SS-21s, and HQ-2 mod) can reach Seoul or the forward battle areas only. The short range ballistic missiles (Scud B, Scud C, and Scud C mod) can reach the rest of the ROK, including other ROK urban areas and military targets like airfields; they would not be able to reach many targets in Japan or other countries. All other North Korean missiles (No Dongs and Taepo Dongs) would primarily reach Japan; they could go beyond to a few targets like Guam and parts of Alaska, but *increasing the missile range from that of a No Dong II to that of a Taepo Dong II allows North Korea to cover very few extra targets of interest to North Korea.*⁵²

⁵²This observation raises the question of why North Korea would be developing the Taepo Dong missiles. In part, the Taepo Dongs are a stepping stone to the eventual North Korean ICBM, themselves having some capability to reach U.S. soil with adjusted configurations (like the three stage Taepo Dong I that was tested in 1998) and payloads. At least as important, though, is the fact that missiles of these ranges will be of high interest to countries like Iran and Syria, providing North Korea a potential source of hard currency.

North Korea's ability to damage cities or airfields in the ROK or Japan is given in Table 9.8 in terms of the coverage of cities and airfields. Each "coverage" entry assumes the entire missile force of the appropriate range is expended on that target with the indicated warhead type. The differences in the minimum and maximum coverage reflect uncertainty in ballistic missile performance and quantity. For example, using purely CW warheads and firing all short-range missiles at ROK airfields, North Korea could cover ROK airfields in 1999 between 140 percent and 860 percent (including consideration of missile reliability). The calculations for nuclear weapons are different: It is assumed that North Korea has only between 1 and 5 small (roughly 10 Kt) nuclear weapons available in 1999, and will have only between 10 and 20 available in 2010; only these weapons are counted in the nuclear assessments.

Table 9.8 shows some important patterns in the North Korean ballistic missile threat. North Korean ballistic missiles would generally not be well used with HE or HE submunition warheads because their coverage is so low.⁵³ The best results for North Korean

Table 9.8

Evaluating North Korean Ballistic Missile Attacks in Northeast Asia

Country	Year	Target	Pop (1,000)/ Airfields	Coverage of the Indicated Targets			
				Nuclear	CW	HE Submn	HE
ROK	1999	Cities	33,000	5–25%	70–210%	2–6%	1–2%
	2010	Cities	37,000	50–100%	110–230%	3–8%	2–3%
	1999	Airfields	23	2–8%	140–860%	5–30%	1–4%
	2010	Airfields	23	15–30%	190–1,010%	8–40%	1–5%
Japan	1999	Cities	50,000	1–6%	4–5%	0.1–0.2%	0.02%
	2010	Cities	53,000	13–25%	20–25%	0.7–1.0%	0.1%
	1999	Airfields	36	1–5%	25–75%	1–3%	0%
	2010	Airfields	36	10–20%	80–240%	4–10%	0–1%

⁵³The exception might be if submunition warheads were fired at the parts of a few airfields where unsheltered aircraft (like airlift aircraft or fighters stored in revetments) or tent cities for deploying personnel were located, but this would be a selective use of only a portion of the force. As shown in Table 9.4, the ability of even submunition warheads to damage such targets is limited by North Korean missile inaccuracy.

ballistic missiles would be achieved by using CW warheads, which on average could cover ROK airfields (or target types with similar numbers) several times. Assessments of the impact of such chemical attacks differ widely. However, if North Korea uses a chemical like VX, it is possible that many of the personnel at the ROK airfields would become casualties, and that operations at these airfields could be seriously impaired for weeks if not longer. North Korean ballistic missiles could also cover the three major cities in the ROK with CW, causing millions or tens of millions of casualties.

North Korea lacks sufficient nuclear weapons even in 2010 to cover the ROK airfields with them, though if North Korea had current Chinese nuclear warhead technology,⁵⁴ this coverage could nearly double. North Korean ballistic missiles could also cause much damage to the largest ROK cities using nuclear weapons, especially in 2010. Indeed, North Korea could afford to hold but a fraction of its ballistic missiles (enough to carry its few nuclear weapons) for targeting ROK cities as an ultimate deterrent, and still be able to use most of its ballistic missiles filled with CW to attack military targets like airfields.

North Korea's ability to threaten Japan is far less, though it increases significantly between 1999 and 2010. In 1999, North Korea can threaten only a few million people in the major Japanese cities with either nuclear or chemical weapons, though even that level of damage might give North Korea a significant coercive capability against Japan. By 2010, that threat is about four times greater—still not enough to threaten the full area of the three biggest Japanese cities, but sufficient to kill perhaps 10 million people. Against the 36 major Japanese airfields, the nuclear threats would be modest throughout this period, but ballistic missiles loaded with CW could cover airfields fairly well by 2010. Since North Korea cannot fully damage Japanese military targets, at least in 1999, the real question is how much damage Japan is prepared to suffer rather than yield to North Korean coercion. In 1999 that coercion would be serious but far less than full damage to its largest cities and key airfields; by 2010, Japan is in far greater jeopardy.

⁵⁴China has transferred the means to make North Korean ballistic missiles more accurate and longer range, as noted above. See Bill Gertz, *Op. Cit.* If China also transferred nuclear weapon technology, the result would be most serious.

The potential Chinese ballistic missile threat in Northeast Asia is shown in Table 9.9. This table differs in several ways from Table 9.8. First, we deleted the columns for high explosive coverage because these results are always far less than CW coverage. Second, because we have defined a separate Chinese nuclear and nonnuclear ballistic missile force, the entries for each row show how much damage can be done by the corresponding element of the total force.

In 1999, the principal uncertainty in the nuclear column is with the number of missiles deployed (assuming no warhead miniaturization has occurred in 1999). In 2010, the lower bound reflects the basic payloads shown in Table 9.2, and the upper bound reflects full miniaturization of payloads (which is overly optimistic for 2010, but illustrates how much difference miniaturization could make). The numbers for 2010 suggest that the difference in warhead technology can have a big impact on the effectiveness of the Chinese ballistic missile force: The better payloads would cover cities and airfields far more extensively. The better payloads would allow the short-range Chinese nuclear missiles to cover Taipei six times as well, which implies that with these better payloads, only one-sixth as many missiles would need to be employed to achieve the same effects. Table 9.9 suggests that the better payloads would also make a big difference on airfields, taking the good coverage of the basic

Table 9.9
Evaluating Chinese Ballistic Missile Attacks in Northeast Asia

Country	Year	Target	Pop (1,000)/ Airfields	Target Coverage	
				Nuclear	CW
Taiwan	1999	Cities	8,500	510–760%	45–200%
	2010	Cities	9,500	510–5,200%	180–350%
	1999	Airfields	19	420–620%	85–350%
	2010	Airfields	19	420–2,650%	320–610%
Japan	1999	Cities	50,000	95–240%	5–15%
	2010	Cities	53,000	55–220%	2–15%
	1999	Airfields	36	180–270%	25–65%
	2010	Airfields	36	180–820%	25–240%
ROK	1999	Cities	33,000	370–950%	20–60%
	2010	Cities	37,000	230–870%	10–60%
	1999	Airfields	23	290–430%	40–100%
	2010	Airfields	23	290–1,300%	60–380%

payloads up to a level of coverage which would allow China to attack a wide range of military targets (and not just airfields) with confidence. The bottom-line of these calculations is that China need only deploy a small fraction of its short-range nuclear warhead ballistic missiles opposite Taiwan because the full force has the capability of covering the likely targets many times over.

China's nonnuclear warhead ballistic missiles give it the potential of covering Taiwanese targets well with CW. In these calculations, the principal uncertainty is the number of ballistic missiles deployed with nonnuclear warheads. In 1999, China has at least the ability to achieve fairly good coverage against targets in Taiwan, and perhaps enough missiles to cover them several times over. By 2010, China should have sufficient short-range nonnuclear ballistic missiles to deploy only a fraction against Taiwan and still be able to cover desired targets with CW.

Chinese medium range ballistic missiles (MRBMs: the CSS-2, CSS-5, or JL-1) could be fired at targets in either Japan or the ROK. Ironically, the payload of the CSS-5 is much less than the payload of the CSS-2 it is replacing (500 to 600 kgs versus over 2,000 kgs). As a result, the Chinese nonnuclear MRBMs, while more numerous in 2010, will be able to achieve only about as much coverage of targets in 2010 as in 1999, and in some cases much less. The Chinese nuclear MRBMs could cause substantial damage to military and civilian targets in both the ROK and Japan (China has enough coverage to damage much of both countries), while the nonnuclear MRBMs would have more limited capabilities, especially against Japan. Nevertheless, Chinese nonnuclear MRBMs loaded with CW could still cause millions of casualties in ROK cities in either 1999 or 2010, and could at least cover many of the ROK airfields with CW in either year. But the Chinese nonnuclear MRBM force could be too small to carry on a protracted campaign to keep ROK airfields contaminated with CW. China would have to deploy approximately the high number of ballistic missiles shown in Table 9.3 or find other means (such as tactical aircraft) to support such efforts if it ever chose to carry out a protracted CW campaign against the ROK.

In summary, both North Korean and Chinese ballistic missiles pose a substantial threat in Northeast Asia today and out to 2010. The North Korean ballistic missile threat is primarily based upon CW

warheads, but could also employ a few nuclear warheads and selectively use HE submunitions. The Chinese ballistic missile threat is heavily on the nuclear side, China having developed ballistic missiles first as a means for delivering nuclear weapons. Despite the limited numbers of nuclear Chinese ballistic missiles, they could cause severe damage to key targets in Taiwan, Japan, and/or the ROK, especially if China deploys the advanced U.S. nuclear weapon technology it is alleged to have acquired by espionage. Chinese nonnuclear ballistic missiles do not pose a comparable threat now but might by 2010 if China deploys close to the estimated high quantity of missiles (which intelligence sources indicate that China could do).

THE THREAT BEYOND NORTHEAST ASIA

The North Korean and Chinese ballistic missile threat beyond Northeast Asia has two components: (1) The damage that North Korean and Chinese ballistic missiles could do to targets outside of Northeast Asia, and (2) the impact of North Korean and Chinese ballistic missile transfers on countries outside of Northeast Asia. Each of these components will be addressed.

Damaging Targets Outside Northeast Asia

Even today, Chinese ballistic missiles have sufficient range to attack targets outside of Northeast Asia. While North Korean ballistic missiles lack such range today, they should have it by 2010.

North Korean Attacks. North Korea could decide in the future to threaten or attack targets in either Europe or the United States. However, as shown in Table 9.7, North Korea would require a missile of the range of the postulated North Korean ICBM in Table 9.1 to do so.⁵⁵ It is estimated in Table 9.1 that North Korea might have 25 to 50 such ICBMs in 2010, and it was previously postulated that North Korea might have 10 to 20 nuclear weapons in 2010.

The ability of the postulated North Korean ICBM force to cause damage outside of Northeast Asia is illustrated in Table 9.10. Against the

⁵⁵We assume here that North Korea would not perceive Russia as an adversary.

Table 9.10
Evaluating North Korean Ballistic Missile Attacks
Outside Northeast Asia

Country	Year	Target	Pop (1,000)/ Airfields	Target Coverage	
				Nuclear	CW
FRG	2010	Cities	10,000	17–34%	2–4%
	2010	Airfields	90	2–6%	1–4%
UK	2010	Cities	12,000	14–27%	2–3%
	2010	Airfields	38	4–15%	1–8%
France	2010	Cities	9,000	38–78%	4–9%
	2010	Airfields	40	4–14%	1–8%
U.S.	2010	Cities	24,000	6–12%	0.7–1.4%
	2010	Airfields	180?	1–3%	0.3–2%

countries examined in Europe, North Korean attacks with CW warheads on ICBMs would be relatively ineffective, putting at risk less than one million people and three to four full airfields in any country. North Korean nuclear warheads could have more impact against European cities, putting at risk potentially millions of people; but they would still threaten at most only five to six airfields.⁵⁶ Thus, North Korean ICBMs would likely be used more strategically against Europe, seeking to threaten cities with nuclear warheads. Indeed, these results suggest that North Korea may limit the growth of its ICBM force to those missiles on which it could put more powerful warheads like nuclear or biological weapons (both causing potentially great damage to urban areas).

In assessing damage to the United States, we must first recognize that a North Korean ICBM with 10,000 km range can reach only about half of the United States. In particular, a North Korean ICBM of that range could not reach most of the East Coast of the United States, few areas below Chicago and Detroit in the central part of the United States, and only as far as the western edge of Texas. Table 9.7 divided the principal U.S. cities into those within 10,000 km range and those that are not, but we have no easy way to divide the air-

⁵⁶With current Chinese nuclear weapon technology, the damage to airfields would increase (more than double), but North Korea would still have too few nuclear weapons to carry out a broad countermilitary attack against even a single country.

fields, and thus assume that about half would be within range. Against these numbers, North Korean nuclear ICBMs could put at risk millions of Americans, though only a few targets like airfields. North Korean CW ICBMs would be far less effective, as was the case with European targets.

Note that in these calculations, we have assumed that all North Korean nuclear weapons could be used against the cities of each designated country, or against that country's airfields. If North Korea attempted to spread its attack against both European and U.S. targets, the relative damage levels in each country would be reduced by the fraction of the warheads used against that country. If North Korea were limited to 10 to 20 nuclear weapons in 2010, it would most likely target such weapons against cities, seeking to coerce the United States and its allies into some kind of action, or causing damage in revenge.

Chinese Attacks. China has potentially more adversaries to consider outside of Northeast Asia. Besides potential European adversaries and the United States, China has also traditionally postured some of its ballistic missile force against both India and Russia. Table 9.11 presents the potential coverage that China could achieve against these various countries, including only the UK to represent Europe. For simplicity's sake, we assume that China targets its MRBMs against India (in competition with the targeting of Japan or the ROK), its IRBMs and shorter-range ICBMs (CSS-3, CSS-9, and JL-2) against either Russia or the UK, and its longer-range ICBMs (CSS-10 and CSS-4) against the United States. This targeting allows for nonnuclear options against only India, since we assumed in Table 9.3 that China would not develop nonnuclear IRBMs or ICBMs. While China could develop nonnuclear options for missiles of these longer ranges, it seems unlikely that it will produce many. We have also assumed that China stays with single warhead missiles using the basic payloads, but uses MIRVed warheads with the miniaturized payloads. The high end of the uncertainty ranges in 2010 includes these MIRVed payloads, along with the broad uncertainty in the number of nuclear IRBMs and ICBMs.

Against Russia, Chinese nuclear IRBMs have the ability to destroy Moscow and St. Petersburg and their 16 million inhabitants. But this missile force is inadequate, even with nuclear weapons, to destroy

Table 9.11

Evaluating Chinese Ballistic Missile Attacks Outside Northeast Asia

Country	Year	Target	Pop (1,000)/ Airfields	Target Coverage	
				Nuclear	CW
Russia	1999	Cities	16,000	180–310%	—
	2010	Cities	16,000	140–830%	—
	1999	Airfields	294	5–8%	—
	2010	Airfields	294	15–105%	—
India	1999	Cities	55,000	290–750%	15–45%
	2010	Cities	55,000	180–690%	10–50%
	1999	Airfields	61	110–160%	15–40%
	2010	Airfields	61	110–480%	20–140%
UK	1999	Cities	12,000	75–130%	—
	2010	Cities	12,000	60–350%	—
	1999	Airfields	38	35–65%	—
	2010	Airfields	38	110–800%	—
U.S.	1999	Cities	54,000	25–220%	—
	2010	Cities	54,000	12–125%	—
	1999	Airfields	388	4–27%	—
	2010	Airfields	388	11–92%	—

more than a portion of Russian military targets like airfields until China deploys miniaturized payloads with MIRVs on many of its missiles, increasing the potential airfield coverage to just over 100 percent. China's ability to destroy Russian military targets would still be largely a regional capability in order to cover more than just airfields (likely targeting part of Russia rather than the whole country).

Against India, China would have the ability to cover Indian cities many times over with nuclear MRBM warheads, allowing it to position a part of its force opposite India, and a part opposite targets in Northeast Asia and probably Russia (since some Russian targets would be within MRBM range). China could barely cover India's airfields with its entire fleet of nuclear MRBMs in 1999, but the enhanced, MIRVed payloads of 2010 would allow China to threaten well both Indian cities and military targets like airfields. Chinese nonnuclear ballistic missiles would provide less coverage of Indian targets, though potentially enough to provide some powerful coercive potential below the nuclear threshold. A key issue is thus how India might react to Chinese ballistic missile attacks with CW,

recognizing the Chinese potential to escalate to nuclear attacks against India with devastating consequences.

Against the UK, Chinese IRBMs and short-range ICBMs would cover most of the cities and a reasonable percentage of the airfields until MIRVing would allow China to cover UK airfields well. Still, it is likely that the primary target of this force is Russia as opposed to any European country, and China would not have sufficient missiles in these classes to fully cover both Russia and the military targets in Europe even when China miniaturizes its warheads. Thus, it seems likely that most of these missiles would be targeted against Russia, but a small portion of these missiles would be retained for strategic coercion of Europe, seeking primarily to deter actions by the European countries rather than seeking to defeat/destroy them.

The coverage of Chinese longer-range ICBMs against U.S. cities is very uncertain because of the uncertainty in the number of Chinese missiles. At the very least, China can put at risk over 10 million Americans today (25 percent of 54 million), a fairly substantial basis for deterring U.S. action. Given the data in Table 9.2, Chinese coverage of U.S. cities falls significantly in 2010, which is due to both the modest numbers of Chinese CSS-10s in 2010, and the lower payload of the CSS-10 versus the CSS-4. The Chinese acquisition of miniaturized warheads would improve Chinese coverage, but not offset these other considerations. It seems unlikely that China will plan to reduce its ability to threaten the United States, and thus, since it has decided to deploy a replacement ICBM with a much lower payload, we anticipate that it will deploy more of them (at least 100 or more?). China's coverage of U.S. airfields is also low, though MIRVing of its payloads would increase this coverage considerably; China would have at least enough capability to target U.S. military airfields. Thus, this analysis suggests that China will likely MIRV its CSS-10s using advanced warhead technology, and could still deploy 100 or so of them to sustain existing levels of coverage against U.S. cities and expand coverage against U.S. military targets.

Summary. This analysis suggests that if North Korea and China develop their ballistic missile forces as postulated, they will be able to pose serious threats against their potential adversaries outside of Northeast Asia. While these threats would not be as robust as the Soviet Cold War ballistic missile threat, it would still allow North

Korea and China to apply considerable strategic coercion, and in many cases allow China to also cover key military targets in the countries of its adversaries. Chinese acquisition of improved nuclear weapon technology is not the minor issue claimed by some experts; China could *vastly* increase its ballistic missile capabilities to very meaningful levels by deploying high-tech MIRVed nuclear weapon payloads.

Transfers to Third Countries and the Global Implications

North Korea and China have been major proliferators of both ballistic missiles and ballistic missile technology. The text above discusses North Korean transfers of missiles to Iran and Syria, but they are also known to have transferred missiles to several other countries, as shown in Table 9.12.⁵⁷ North Korea may have transferred as many as 600 to 900 Scuds to other countries.⁵⁸ Some countries have received large numbers of Scuds, allowing especially Iran to develop a robust ballistic missile force that may be close to North Korea's in size. In other cases, more limited transfers have occurred, but even these raise significant new threats in various parts of the world. In addition, the transfer of missile production capability allows the recipient countries to build as many missiles as they choose to (within financial constraints).

⁵⁷North Korea is believed to have helped Egypt establish a production capability for improved versions of the Scud B and Scud C, which effort involved at least the transfer of Scud components. See "Offensive Weapons (Unclassified Projects), Egypt," *Jane's Strategic Weapon Systems*, Issue 28, Sept. 1998. Vietnam has also acquired Scuds from North Korea. Though a quantity and type of Scud is not divulged, it is suspected that Scud Cs were transferred, and the value of the contract suggests that fewer than 100 Scud Cs were involved. See Robert Karniol, "Vietnam Stocking Up 'Scuds,'" *Jane's Defence Weekly*, April 4, 1999. The same report says that North Korea has also sold Scuds to Cuba, Iraq, and Libya.

⁵⁸Discussions of aggregate Scud exports suggest that a total closer to the smaller number is most likely. In 1996, the South Korean National Unification Board indicated that North Korea had exported about 400 Scuds to Iran, Syria, and other Middle East nations, which would have increased closer to 500 by 1998. See "Weekly Notes," *Washington Times*, Sept. 27, 1996, p. 18. Jane's estimates that 400 total Scud Bs and Scud Cs were exported as of 1998, per "Scud C Variant," *Jane's Strategic Weapon Systems*, Issue 28, September 1998. In 1999, a Korean source reported that 490 Scuds had been exported to Iran, Syria, and Iraq. See "Intelligence Confirms 15 Missile Sites in NK," *JoongAng Ilbo* Internet site, March 28, 1999.

Table 9.12

North Korean and Chinese Ballistic Missile Transfers to Third Countries

North Korean Missiles	To Country	Numbers	Chinese Missiles	To Country	Numbers	
SRBMs						
Scud B	Iran	250–400 + Prod	CSS-8 (M-7)	Iran	90–200	
	Egypt	Prod		Iraq	?	
	Syria	100–130 + Prod		CSS-7 (DF-11/ M-11)	Iran	? + Prod
	UAE	30?			Pakistan	30–84 + Prod
Scud C	Cuba	?	CSS-6 (DF-15/ M-9)	Syria	20 + Prod	
	Iran	150–220 + Prod		Syria	80	
	Libya	?		Libya	60	
	Syria	50–80 + Prod		Egypt	?	
	Vietnam	30–50?		Iran	?	
				Pakistan	?	
MRBMs						
No Dong I/II	Iran	12 + Prod	CSS-5 (DF-21)	Saudi Arabia	?	
	Pakistan	10-12 + Prod	CSS-2 (DF-3)	Saudi Arabia	50–60	
Taepo Dong I	Iran	? + Prod				
	Pakistan	? + Prod				

SOURCES: "Foreword," *Jane's Strategic Weapon Systems*, Issue 21, April 1996; "Offensive Weapons (Unclassified Projects), Egypt," "CSS-2," "CSS-5," "CSS-6," "CSS-7," and "CSS-8," *Jane's Strategic Weapon Systems*, Issue 28, Sept. 1998; CDISS Internet site, "National Briefings: Iran," "National Briefings: Syria," "Update on the Ghauri," 1999; Robert Karniol, "Vietnam Stocking Up 'Scuds,'" *Jane's Defence Weekly*, April 4, 1999; and The International Institute for Strategic Studies, *The Military Balance 1998/99*, October 1998, p. 144.

In addition to the transfers mentioned in Table 9.12, there have been stories about other planned transfers, including the possibility of North Korean Scud sales to Zaire and Iraq, and the possibility of Taepo Dong sales to Peru and Libya. Once North Korea fields an operational Taepo Dong missile, it will likely be a popular item for a number of states. Some states like Iran may be able to build a production capability directly from the ability to produce No Dongs and Scuds (the reported first and second stages of the Taepo Dong I).

It is clear that adversary ballistic missile capabilities are becoming a major source of concern for the United States in the Middle East. Iraq developed strong ballistic missile capabilities before the 1990–1991 Gulf War, including both chemical and biological weapon warheads. The United States continued efforts to control these Iraqi capabilities for eight years after the end of that war. At the same time, the Iranian ballistic missile capabilities are becoming a very serious threat to U.S. operations in the Arab Gulf area, especially with the Iranian efforts to stockpile chemical weapons and to develop biological and nuclear weapons. Iran can pose a serious threat today, and by 2010 that threat will only be greater. Syrian and Iranian ballistic missiles threaten Turkey and eventually will threaten other parts of NATO. This is of particular concern because of Turkish/Syrian disputes over the water rights on the Euphrates River.

In addition, both Syria and Iran are posing ballistic missile threats against Israel, a key U.S. interest. In 1994, Israeli Prime Minister Yitzhak Rabin stated that, “. . . the Syrian missile arsenal poses a much greater threat to Israel than the Iraqi missile attacks during the 1990–1991 Gulf War, and could potentially make Israel’s Gulf War experience seem like ‘a children’s game.’”⁵⁹

North Korean and Chinese ballistic missiles exported to Libya could become a threat to NATO as well. From Libya, a ballistic missile with a 1,500 km range (like the No Dong II) could reach all of Greece, most of Turkey and Italy, and parts of Spain and France. With a 2,000 km range (like the Taepo Dong I), a ballistic missile could reach all of Hungary, much of Germany and the Czech Republic, and parts of Portugal and Belgium.

The North Korean and Chinese transfer of ballistic missiles to Pakistan have helped destabilize the relationship between India and Pakistan, contributing to ballistic missile development races and efforts to test and deploy nuclear weapons. Both Pakistan and India are likely to deploy ballistic missiles with nuclear warheads, which could cause any future conflict between India and Pakistan to become far more than the traditional border skirmish.

⁵⁹Sharone Parnes, *Defense News*, 27 June 1994, p. 16.

In short, North Korean and Chinese ballistic missile sales directly threaten U.S. interests in several critical parts of the world, and indirectly threaten U.S. interests in South Asia by raising the potential for the world's first nuclear exchange in a conflict between India and Pakistan.

CONCLUSIONS

North Korean and Chinese ballistic missiles are a serious threat to U.S. and ROK interests in Northeast Asia and globally. The threats they pose, though, are different: China built its ballistic missile force initially as a nuclear force, and now appears to be adding significant nonnuclear capabilities. North Korea built its ballistic missile force to deliver nonnuclear weapons, but it is gradually developing nuclear capabilities. Both countries are marketing their missiles to many other countries.

Depending upon how the various uncertainties discussed herein are resolved, and the kinds of warheads North Korea chooses, North Korea has the potential to seriously damage air operations at ROK airfields and operations at other military facilities. North Korea could also threaten much of the population of Korea's largest cities. North Korean ballistic missiles could do less damage to Japan, but still sufficient to pose a substantial coercive threat to millions of Japanese. By 2010, North Korea may also be able to pose modest yet serious threats to European cities and cities in the United States. It is difficult to tell whether North Korean threats of this magnitude would be sufficient to coerce the United States and/or its European allies to disengage from a conflict in Korea, but they should be sufficient to discourage U.S. military coercion of North Korea, a major North Korean objective. "As the North Koreans point out, 'The American threat continues to grow by leaps and bounds.' They believe that only a counterthreat can sober up Washington and prevent it from undertaking a campaign of 'Yugoslavian-type aggression' against the DPRK."⁶⁰ Moreover, North Korean threats should at least indirectly coerce the West into providing some assistance to the

⁶⁰Northeast Asia Peace and Security Network, "DPRK Report #19: The Importance of NK Missiles," July–August, 1999.

North (as a way of avoiding war)⁶¹ and impose some control on escalation if conflict comes to Korea.

China could seriously damage both Taiwanese airfields and Taipei with its short-range nuclear ballistic missiles, and may be able to do so as well with its nonnuclear ballistic missiles if they use chemical warheads. They could also pose very serious threats to the ROK, Japan, India, and Russia. While Chinese ballistic missiles would be less capable against European countries or the United States, they could still cause enough damage to give China an effective basis for coercion of those countries in cases of all but their very vital interests.

Finally, North Korean and Chinese ballistic missile proliferation is a major destabilizing factor in the Middle East, the Mediterranean, and South Asia.

⁶¹“North Korean interlocutors do not hide the fact that ‘the missile card’ could be quite useful in their bargaining with Washington. They argue that ‘If Americans are afraid of our missiles, let them conclude a peace treaty with the DPRK, lift economic sanctions, and do other things to demonstrate their sincerity and friendship. Then, the DPRK may reconsider its missile program.’” Ibid.

**COPING WITH THE NORTH KOREAN MISSILE
THREAT: IMPLICATIONS FOR NORTHEAST
ASIA AND KOREA**

Chung Min Lee

RECONSIDERING NORTH KOREA'S STRATEGY

Despite nearly a decade of objectively worsening internal and external dynamics, North Korea continues to defy conventional wisdom. Under conditions that in most countries would precipitate major political upheaval, Kim Jong Il remains firmly in power. Nearly five years after the death of Kim Il Sung, eight years of consecutive economic contraction, famine, and progressively diluted alliances, structural integrity continues to be maintained. Contesting Kim's supreme reign and dominance of the North Korean polity is virtually unthinkable. From the outside looking in, and almost incredibly, North Korea seems to thrive on a spectrum of self-engineered crises. North Korea has demonstrated its ability to withstand severe pressures. And against nearly all odds, it has survived.

This basic supposition, i.e., that the Democratic People's Republic of Korea (DPRK) continues to attach paramount importance to survival and has so far succeeded, is a necessary but insufficient condition in understanding North Korea's strategic calculus. Why? Because equating North Korea's fundamental national security strategy with regime or state survival hinders an objective reading of Pyongyang's strategic objectives at three different, but interrelated, levels.

First, akin to explanations for the Soviet Union's external behavior during the Cold War, such a view attaches undue importance to North Korea's enduring siege mentality. Inherently offensive and highly destabilizing developments such as North Korea's weapons of mass destruction (WMD) and robust ballistic missile programs should be understood in the context of North Korea's profound sense of insecurity. In addition, while one cannot totally discount the military utility of Pyongyang's WMD arsenal, actual employment of these systems is a dubious proposition. The principal reason behind North Korea's WMD program, including its array of ballistic missiles, should be seen essentially as bargaining chips. Therefore, with the correct mix of incentives—diplomatic recognition by the United States and Japan, direct and institutionalized communication channels with Washington, concerted economic assistance, and even declaratory guarantees of survival—North Korea will be ultimately dissuaded from pursuing its WMD program.

Second, despite North Korea's selective probes and challenges against South Korea, the United States, and even Japan, these are *tactical* and essentially *defensive* in nature. Even if North Korea wanted to, it doesn't have the overall capability to inflict irreparable damage on the South. More significantly, the ROK-U.S. Combined Forces Command (CFC) has the ability to deter and defend a wide array of North Korean actions. The absence of sophisticated national technical means (NTM) and limited intelligence support from China and Russia compels the North to undertake a range of probes against the South and even Japan. In essence, while North Korea's provocations should be carefully watched, they do not portend any fundamental shift in North Korea's strategy vis-à-vis the South.¹

¹On June 22, 1998, a North Korean mini-submarine was accidentally caught in a fishing net in South Korean waters. The ROK Navy towed the submarine and when it opened the hatch, four crew members and five agents' bodies were discovered. South Korea's President stated that despite this incident, the government's "Sunshine Policy" would remain unchanged. The Ministry of National Defense downplayed the affair as a "routine" North Korean mission and one unidentified senior official noted that the North was likely to continue to undertake similar probes since "human intelligence is the only way they've got to spy on us." Shim Jae Hoon, "Kim the Cool," *Far Eastern Economic Review*, July 9, 1998, p. 16. Barely 20 days after this incident, a midget submarine was detected and subsequently sunk by the ROK Navy on July 12. While the government responded more quickly to the second incursion, then Senior Secretary for Foreign and National Security Affairs, Lim Dong Won, said that Seoul would continue to be "flexible" in its dealings with the North. In neither case did South

Third, although the possibility of a North Korean collapse cannot be discounted, such a development is undesirable. Under the rubric of South Korea's comprehensive engagement or "Sunshine Policy" toward the North, Seoul does not seek unification by absorption. That said, South Korea should place primary emphasis on buying time—for North Korea to undertake partial economic reforms, to persuade the North of the virtues of active engagement, and to formulate a more viable exit strategy. But the strategy of buying time suffers from a key conceptual weakness since it essentially fails to address what endstate lies at the end of buying time. In other words, if a reformed and strengthened North Korea emerges over time, what incentive does it have to accommodate ties with the South and the United States, in addition to giving up its WMD ambitions? As the *Washington Post* wrote in August 1998, "the danger was that the North Koreans were buying time themselves, taking advantage of U.S. generosity while pursuing their nuclear ambitions. . . . If North Korea is taking the ransom (fuel and food) and going ahead with its weapons program, then it becomes clear that North Korea is stringing America along and not the reverse.² Or as the "Armitage Report" noted in March: *The notion that buying time works in our [U.S. and South Korea] favor is increasingly dubious.* (Emphasis added.) A growing body of evidence suggests that it is North Korea that is buying time to consolidate the regime, continue its nuclear weapons program, and build and sell two new generations of missiles, while disregarding the well-being of its 22 million people.³

SOUTH KOREA'S PEACE OFFENSIVE AND THE SUNSHINE POLICY

Supporters of the Sunshine Policy insist that the ROK is not giving up any of its traditional national security and defense assets in order to pursue comprehensive engagement with the North. Since the alternative to comprehensive engagement is a hardline policy,

Korea undertake military responses. See "Stranger on the Shore," *The Economist*, July 18, 1998, p. 27.

²"Pyongyang Blackmail," *International Herald Tribune*, August 25, 1998, p. 6.

³Richard L. Armitage, *A Comprehensive Approach to North Korea* (Washington, D.C.: Institute for National Strategic Studies, National Defense University, March 1999), p. 3 [Internet edition].

proponents insist that such options are always available if engagement fails. In other words, if the North ultimately rejects South Korea's overtures and refuses to accept a comprehensive package of incentives jointly from the ROK and the United States, then South Korea as well as the United States (and even Japan) can and should apply alternative strategies and policies. Proponents also insist that comprehensive engagement is the only strategy that is acceptable to South Korea's allies, friends, and neighbors. Specifically, assuming that the ROK pursues a hardline policy toward the North, such a policy will not be politically sustainable either in Washington or Tokyo over the long haul. In addition, there is very little chance that such a policy would be supported by China and Russia.

Finally, if North Korea is not going to respond positively to the Sunshine Policy there is little reason to believe that Pyongyang will change its overall policy toward South Korea or the United States once Seoul and Washington adopt hardline alternatives. As South Korean Foreign Minister Hong Soon-young recently wrote in *Foreign Affairs*, "South Korea aims to achieve peace and reunification methodically and gradually instead. This will take time—perhaps a long time—but it will be worth the wait. And it is the only viable course to pursue."⁴ As a result, even if short-term dividends may be limited with no dramatic shifts in North Korean policy (such as a South-North summit meeting and significant progress based on the landmark 1991 South-North Basic Agreement), Sunshine Policy advocates argue that the pressure or onus is on the North. Specifically, they insist that North Korea's overall bargaining power, political credibility, economic capability, and even military strength is considerably limited compared to South Korea's. Despite North Korea's show of strength through the August 1998 Taepo Dong I missile test, provocations against the South (and even Japan), and highly unrealistic demands such as \$3 billion over a three-year period to freeze its ballistic missile program, supporters of the Sunshine Policy argue that these demands illustrate North Korea's relative *weakness* rather than strength. In June 1998 prior to his state visit to Washington, President Kim stated in an interview with *The New York Times* that "As we stick to this tolerance on our part, with such a flexible

⁴Hong Soon-young, "Thawing Korea's Cold War: The Path to Peace on the Korean Peninsula," *Foreign Affairs*, Vol. 78, No. 3 (May/June 1999), p. 8.

approach, then perhaps not in the near term but in the long run we'll be able to see changes in North Korea's attitude."⁵

In essence, the genesis of South Korea's "win-win strategy" can be summarized as follows: While the ROK continues to confront a range of potential military threats from the North, these can be readily managed through existing ROK-US deterrence and defense assets. More important, since the primary objective is to deter war—virtually at all costs—the United States and the ROK have no other viable alternative.

THE LIMITATIONS OF ENGAGEMENT

Notwithstanding the positive attributes of comprehensive engagement, the Sunshine Policy has come under criticism on a number of fronts. First and foremost, detractors of the policy have argued that, while a strategy of engagement vis-à-vis the North could conceptually produce positive change, one has to assess both the validity of the core assumptions behind the Sunshine Policy and the domestic political environment in which the policy is being pursued. Those who have advocated alternative strategies and policies toward the North base their argument on the following points.

First, based on North Korea's past record including its reactions to the Kim Dae Jung government over the last 16 months, there is very little evidence that suggests a significant thawing of North Korea's position on core national security issues. If North Korea really wanted to engage with the South, Pyongyang should not have launched the Taepo Dong I missile in August last year; nor should it have sent mini-submarines and spy ships into South Korean and Japanese waters.⁶ Despite North Korea's severe economic hardships, the fact remains that the DPRK continues to invest some 22 percent of its GNP on defense. Moreover, it is naïve to believe that the North

⁵Nicholas A. Kristoff, "South Korea President Urges Closer Ties With North," *The New York Times*, June 2, 1998, (Web edition), p. 3.

⁶The most recent incident occurred on June 9 when five KPA Navy patrol boats crossed into South Korean waters in the Yellow Sea. Although warning shots were not fired by ROK Navy patrol vessels, one patrol craft collided slightly with a North Korean ship.

will ultimately give up its ballistic missile program in addition to its WMD arsenals since they have only limited military value.

Second, the core weakness or shortcoming of the Sunshine Policy is that it provides no endstate other than coexistence with the North. Moreover, since the policy has ruled out the possibility of a North Korean collapse by stating categorically that the South does not seek unification by absorption, it is unrealistic and places too much of an emphasis on normative ideals.

Third, what are the benchmarks of success other than maintenance of the status quo? While supporters insist that it is too early to judge the success or failure of the Sunshine Policy, detractors point out that the policy fails to take into serious consideration alternatives that have to be pursued if it fails.

The pros and cons surrounding the efficacy of the Sunshine Policy or lack thereof are unlikely to be resolved anytime in the near future. The Kim Dae Jung government has placed significant political capital on the success of comprehensive engagement. On the diplomatic front, Seoul has emphasized trilateral policy coordination between the ROK, the United States, and Japan as the linchpin of the Sunshine Policy. While it may be too early to state whether the policy will ultimately work or will need to be substantially if not fundamentally revamped, the fact remains that at least for the time being, the Kim Dae Jung government is unlikely to significantly alter the basic premise of the Sunshine Policy.

One final point should be made in the context of the on-going debate over South Korea's "peace offensive" to the North, namely, North Korea's response. North Korea's official pronouncements have been uniformly negative since Pyongyang has maintained that the Sunshine Policy seeks ultimately to destabilize the North in a revamped absorption policy. Just a few days after the North agreed to hold the second round of vice-ministers' talks in Beijing in more than a year, for example, the official party newspaper, *Nodong Shinmun*, reported that:

The leading forces of unification in South Korea are not even Communists but it is ludicrous for the "People's Government" in the South to think that it can embrace North Korea when it can't even embrace the core forces of unification within the South. . . .

The South Korean authorities should change themselves before they attempt to change others. The United States and Japan are not infinite providers of security. They must awaken from the delusions of U.S.-Japan leadership. Only death awaits those who attempt to struggle with fellow Koreans through the reliance on foreign powers under the banner of international cooperation.⁷

THE STRATEGIC FOUNDATIONS OF NORTH KOREA'S BALLISTIC MISSILE PROGRAM

If one chooses to perceive developments in North Korea through the Sunshine Policy prism, it stands to reason that one of the most tangible security threats in the post-Cold War era—North Korea's protracted WMD ambitions—*should not necessarily* warrant critical concern. Proponents of the Sunshine Policy have argued, none more forcefully than President Kim, that patience will result in tangible results.⁸ The problem is not with engagement per se, but its underlying assumptions as noted above. Supporters of the Sunshine Policy argue that North Korea's primary motivation for developing a range of ballistic missiles such as the No Dong I/II and the longer-range Taepo Dong I are threefold: (1) to offset North Korea's own vulnerabilities in the face of robust ROK-U.S. deterrence and defense assets; (2) to earn much-needed foreign currency through missile exports; and (3) as a bargaining chip to secure political, security, and economic incentives from South Korea and the United States.

Nevertheless, the supposition that North Korea's WMD program is driven not by offensive inclinations but primarily by defensive im-

⁷"Namjoson eui Poyong Jeongchek eul Haebu Handa" [Dissecting South Korea's Embrace Policy], *Nodong Shinmun*, June 4, 1999, as reported in *North Korea Today*, June 5, 1999, pp. 2 and 5. The term "People's Government" or "Government of the People" was coined by the Kim Dae Jung government to differentiate it from previous administrations, i.e., that it is the most democratic and the most populist government to gain power in South Korea. For its part, the Kim Young Sam government referred to itself as the "Civilian Government" or as the first nonmilitary government since 1961.

⁸The Sunshine Policy was first enunciated after President Kim Dae Jung's inauguration in February 1998. The policy contains three key guidelines: (1) to maintain a robust defense posture in response to possible North Korean provocations; (2) to discount the option of unification through absorption; and (3) to de-link economic cooperation and exchange from political conditions.

pulses misses several important points. To begin with, North Korea's WMD activities and programs *predate* its accelerated economic downturn since the early 1990s and rising concerns surrounding regime survival. In other words, North Korea began work on its WMD program prior to the late 1980s in order to offset what it perceived as growing disparity with the South. Thus, while WMD capabilities gained increasing value as a survival mechanism going into the 1990s, North Korea always placed a very high value on the strategic utility of WMD. Historically, the U.S. air campaign against the North during the Korean War convinced Kim Il Sung of the necessity of developing comprehensive strategic capabilities, including ballistic missiles and WMD weapons, although North Korea's nuclear weapons program probably did not begin in earnest until the latter part of the 1960s. That said, by the early 1960s, North Korea began to revamp its military strategy through the enunciation of the so-called "Four Great Military Lines" doctrine, including: (1) arming of the entire people; (2) fortification of the entire country; (3) the creation of cadres throughout the People's Armed Forces; and (4) modernization of weapons systems.⁹

Throughout the 1960s, Kim Il Sung tried to emulate North Vietnam's politico-military strategy toward South Vietnam by stressing destabilizing operations against the South and to exploit fully the opportunities tendered by potential U.S. force reductions in the South. Nonetheless, inciting an indigenous "people's revolution" in the South ultimately failed, and despite the withdrawal of the U.S. 7th Infantry Division from the ROK in 1971, the United States continued to retain its security commitment to the South. As the South Korean economy began to take off in the early 1970s, and particularly

⁹Scholars and analysts point to different dates when the "Four Great Military Lines" doctrine was first announced. According to Lee Ki-taek, North Korea first revealed its new doctrine in December 1962 during the 5th Combined Assembly of the 4th Session of the Korean Workers' Party's (KWP) Central Committee. Lee Ki-taek, *Hanbando eui Jeongchi wa Kunsu: Iron kwa Shilchae* [Politics and Military on the Korean Peninsula: Theory and Reality] (Seoul: Kanam Publishing Company, 1984), pp. 373–374. Conversely, Kang Seong Hak argues that the doctrine was *officially* promulgated in October 1996 whereas Joe Burmudez states that it was October 1963. See Kang Seong Hak, "Bukhan Kunsu Jeolryak eui Yeoksajeok Kochal: Teuroi Mokma aeseo Reosia Roulette euro?" [A Historical Review of North Korea's Military Strategy: From the Trojan Horse to a Russian Roulette?], *Jeolryak Yeonku* [Strategic Studies], Vol. 4, No. 3 (1997), p. 24.

after Jimmy Carter decided in July 1979 to mothball his earlier pledge to incrementally withdraw U.S. ground troops, North Korea reviewed its overall strategic posture.¹⁰

With modernization of the ROK armed forces in the 1970s and 1980s through the Yulgok Program, North Korea's strategic calculus changed. By the mid-1980s, coincident with worsening economic conditions, South Korea's growing economic strength, robust ROK-U.S. relations, and sustained ROK force modernizations, North Korea began to accelerate work on its ballistic missile development and WMD programs. From the standpoint of grand strategy, Pyongyang's capability to unify the peninsula by force became increasingly untenable as a viable military option. As one report recently noted, "the combination of South Korean strength and U.S. support means that Pyongyang cannot reunify the peninsula on its own terms militarily."¹¹ Nonetheless, this was the primary motivation for developing WMD capabilities, since it would provide the DPRK with both a significant force multiplier and new strategic buffer zone (in the sense of constraining ROK and U.S. deterrence and defense dynamics). Therefore, notwithstanding the utility of WMD arsenals as a key survival mechanism, North Korea's WMD program was begun well before regime survival became a critical issue.

Some defense analysts have argued that while North Korea's ballistic missile and WMD capabilities should not be ignored, neither should South Korea overestimate their intrinsic military repercussions. For instance, after the successful launching of the medium-range missile on August 31, 1998, some analysts argued that the primary objective of North Korea's missile launch was to celebrate Kim Jong Il's rise as Chairman of the National Defense Committee and that, at any rate, the range of the missile indicated that Japan, rather than South

¹⁰Kang Seong Hak, "Bukhan Kunsu Jeolryak eui Yeoksajeok Kochal: Teuroi Mokma aeseo Reosia Roulette euro?" [A Historical Review of North Korea's Military Strategy: From the Trojan Horse to a Russian Roulette?], *Jeolryak Yeonku* [Strategic Studies], Vol. 4, No. 3 (1997), pp. 36-37. See also Lee Kyu Yeol, *Nambukhan Kunsaryeok Bikyo Yeonku* [A Comparative Assessment of South-North Military Capabilities], (Seoul: Korea University, unpublished Ph.D. dissertation, 1994), pp. 56-58.

¹¹Institute for National Strategic Studies, *1998 Strategic Assessment: Engaging Power for Peace*, (Washington, D.C.: NDU, 1998), p. 41.

Korea, was the principal target. Such views, however, are simply wrong.

Although it remains uncertain whether North Korea will actually employ its WMD arsenal in warfare, the fact that South Korea has to take into serious consideration the WMD factor in current and future defense planning scenarios already provides the North with a strategic edge *beyond* its general purpose forces. Moreover, North Korea's WMD capabilities, in particular its ballistic missiles, could severely constrain U.S. reinforcement efforts. If North Korea threatens to target U.S. bases in Japan or air fields and harbors in Japan, it could retard or impede personnel and material reinforcements into South Korea. Additionally, if North Korea launches a ballistic missile attack on South Korean air fields and harbors, it could seriously impede Flexible Deterrence Options (FDO) operations by the United States. The argument has been made that even if the North uses ballistic missiles, the accuracy or circular error probable (CEP) of the No Dong I (about 1 km) is such that it would not be able to undertake surgical air strike missions.¹²

But this point is moot. Even if a limited number of SCUD-C or No Dong I missiles are launched on Seoul and other key cities and industrial sites, there would be immediate psychological consequences in the South. Moreover, a concerted ballistic missile attack against Seoul will have tremendous repercussions, regardless of the accuracy of the missiles. Finally, any use of WMD by the North will place immediate pressure on the Korean and American National Command Authorities (NCA) to respond in-kind with the very real likelihood of escalation, including the potential release of nuclear

¹²For example, Shunji Taoka has argued that a "very poor" CEP of the SCUD missiles, combined with their limited payload means that "the tactical value of SCUDS [are] even lower than jet trainers." He also argues that based on the Iraqi launch of SCUDs during the Gulf War and resultant public reactions in Tel Aviv and Riyadh, a North Korean SCUD attack on Seoul would not result in widespread panic. Shunji Taoka, "Air Forces of the Two Koreas: A Comparative Analysis," paper presented in the "First International Conference on Air Power in 21st Century Korea," coorganized by the Center for International Studies, Yonsei University, the Institute of East and West Studies, Yonsei University, and the Pacific Century Institute, May 22–23, 1998, pp. 86–90.

weapons (assuming that North Korea has a limited number of operational nuclear warheads and launch vehicles).¹³

While a more detailed overview of North Korea's ballistic missile program and its cumulative impact on Northeast Asia and South Korea is provided below, North Korea's emphasis on WMD capabilities also coincides with changing military dynamics in the region. For North Korea, reliance on the former Soviet Union and China for advanced military technologies and weapons systems was a double-edged sword. While Pyongyang had no choice but to rely on military support from its two major patrons, Kim Il Sung always believed that comprehensive self-reliance, or *Juche*, should also be applied to the military sector. Although North Korea is believed to have acquired the services of a number of Russian technicians following the dissolution of the Soviet Union, by and large self-reliance has been a driving factor behind North Korea's military modernization strategy. Lessons from the Gulf War reinforced this emphasis. As Desert Storm aptly demonstrated, modern warfare can no longer be conducted primarily on the basis of conventional forces. But in order for the North to reap the benefits of RMA technologies, it would have no choice but to divert critical resources to RMA R&D. However, North Korea doesn't have the technological nor financial capabilities to develop core RMA systems and has therefore opted for the next best alternative: acquiring weapons of mass destruction and associated delivery systems.

Thus, North Korea's ballistic missile program and its WMD ambitions have always been based on multiple motivations. Using WMD to boost regime survival is an important facet of North Korea's overall WMD program but it is only *one* of several factors. Indeed, one could argue that if North Korea's primary motivation for pursuing an aggressive WMD program lies in enhancing regime survival and strengthening its diplomatic bargaining position, a far better way would be to enact much needed economic reforms. To

¹³There is no consensus on the current and projected state of North Korea's potential nuclear weapons program. The 1994 nuclear accord was put in place to "freeze" North Korea's nuclear program although of late, new concerns have surfaced such as the discovery of new underground facilities that could be used for nuclear weapons development. For the purposes of this paper, the basic assumption is that while North Korea is not a nuclear weapon state, it has the capability to develop a small number (3-4) of nuclear warheads.

the contrary, even in the midst of pronounced economic downturn, "Pyongyang continues to invest scarce resources in developing and maintaining its military forces, including its chemical and biological warfare and missile programs."¹⁴ In sum, North Korea's WMD and ballistic missile arsenal should be seen in the context of a comprehensive strategy that compresses political, military, and diplomatic objectives. To argue otherwise runs counter to decades of North Korean actions and fundamental strategic *weltanschauung*.

ENHANCING AIR CAPABILITIES IN THE REGIONAL CONTEXT

Although it is difficult to project the types of forces that will emerge in East Asia over the next two to three decades, a number of regional countries are likely to emphasize varying levels of strategic air power technologies including RMA-driven weapons systems. Among the nonnuclear states in the region, Japan has the most advanced defense R&D infrastructure, followed by South Korea, Taiwan, and selected ASEAN countries. In the short to medium term, or until the disappearance of the North Korean threat, however, the ROK and the regional powers will continue to pay close attention to North Korea's overall WMD capabilities. The primary reason why North Korea's WMD and ballistic missile program warrant continuing high-level attention is not only because it could seriously disrupt stability on the peninsula, particularly if North Korea implodes or collapses, but because it has opened a new Pandora's box in coping with military threats from the North.

For the ROK, its principal security concerns in the post-unification era are likely to focus on the long-term force modernization postures of China's PLA, especially its air force and navy, a resurgence of Russian forces (particularly naval) in the Far East, Japan's potential acquisition of more advanced weapons systems, and the level of U.S. strategic engagement in the region.¹⁵ Other factors will also be taken

¹⁴Office of the Secretary of Defense, *Proliferation: Threat and Response*, (Washington, D.C.: U.S. Government Printing Office, 1997), p. 4.

¹⁵Compared to its Cold War standing, the Russian armed forces have atrophied significantly across the board and it will take a significant amount of time before Russia's general purpose forces are able to regain their pre-collapse capabilities. Nonetheless,

into consideration, such as the need for information-dominant systems to meet multiple information warfare challenges and enhanced strategic and tactical intelligence platforms. Over the long run, air and naval force projection capabilities, battlespace denial capabilities (such as submarines), and advanced strategic conventional technologies are likely to emerge as key sources of concern, since all of the major regional players have, or will acquire, the ability to acquire and deploy more advanced force projection capabilities.

Clearly, if any of the currently nonnuclear states of East Asia embark on a nuclear or a major ballistic missile program, such a development will have significant repercussions. North Korea already can be considered to be a "virtual nuclear weapon state," although it is difficult to verify whether North Korea has succeeded in developing a small number of nuclear warheads. If Pyongyang continues to emphasize WMD capabilities as a key element of its military strategy regardless of international pressure, South Korea and Japan could begin to seriously consider their own WMD program including delivery vehicles. To date, and into the foreseeable future, however, it is highly unlikely that either Japan or South Korea would begin a concerted WMD program, particularly since these two states form core security alliances with the United States. But any widespread proliferation of WMD technologies in the region with advanced delivery systems would, at a minimum, have the following repercussions: (1) it would encumber, if not significantly constrain, U.S. power projection operations including rapid reinforcements in an acute crisis; (2) it would result in increased vulnerability among states that do not have the ability to field such systems; (3) it would weaken U.S. conventional deterrence and defense capabilities and increase the cost of mounting conventional operations against states possessing WMD capabilities; and (4) it would result in increased pressure toward even greater horizontal WMD proliferation.¹⁶

Russia still retains its status as the second most powerful nuclear state with significantly advanced military R&D capabilities. Although it will take tremendous financial commitments coupled with overall political and economic stability, Russia's force projection capabilities cannot be ignored.

¹⁶Ashley J. Tellis, "Military Technology Acquisition and Regional Stability in East Asia," in Jonathan D. Pollack and Hyung-Dong Kim, eds., *East Asia's Potential for Instability & Crisis* (Santa Monica, CA: Center for Asia-Pacific Policy, RAND/The Sejong Institute, 1996), p. 55.

To the extent that an increasing number of East Asian forces are likely to introduce various elements of RMA technologies and systems, the fundamental “strategic space” in which these forces will operate over the next two to three decades cannot but also change. North Korea’s robust ballistic missile program—including the deployment of the 500-km range SCUD-C, the ongoing deployment of the 1,000-km-plus range No Dong I missile, and the successful launching of what is believed to be the 1,500-km range Taepo Dong I missile—attests to North Korea’s short- and medium-range ballistic missile capability. North Korea also deploys 20 SA-5 SAMs that can reach nearly one-half of South Korea’s air space, not to mention the 50–70-km range Frog-5/7 SSMs and an array of heavy artillery deployed across the DMZ.¹⁷

Beyond the threat posed by North Korea’s WMD arsenal, a larger strategic change lies over the horizon. Throughout much of the Cold War, no East Asian country, other than China after it became a nuclear power, had the capability to inflict significant military damage on another state based on significant air power, naval platforms or ballistic missiles. Even in the case of China, while nuclear weapons provided it with a “great power” status, its nuclear capability was far behind that of the United States and the Soviet Union. It did not have ICBM capabilities during the Cold War, although it currently has 17 ICBMs (7 DF-5 and 10 DF-4). While the current air power inventory of the Northeast Asian militaries varies quite significantly from country-to-country, combat aircraft, helicopters, SAMs, and ballistic and cruise missiles have already emerged as important regional airpower modernization components. Except for China and North Korea, the overall missile inventory in Northeast Asia (particularly as it applies to Japan, South Korea, and Taiwan) doesn’t pose a critical or an acute threat. For instance, Mongolia has only a limited SAM arsenal (SA-7). In the case of South Korea, it currently has ASMs, AAMs, and SAMs but no SSMs, while Japan has some 70 Type-88 coastal SSMs, 120 Patriot SAMs, and ASMs and AAMs.¹⁸

¹⁷ *Kukbang Baekso 1998 [Defense White Paper 1998]* (Seoul: Ministry of National Defense, October 1998), pp. 44–45.

¹⁸ For a more detailed review of Northeast Asia’s missile capabilities, refer to *The Military Balance, 1997–1998* (London: International Institute for Strategic Studies, 1997). Since the North Korean nuclear weapons program surfaced as a major issue in the early 1990s, significant literature has appeared on the state of North Korea’s nu-

Clearly, C⁴I integrity, target acquisition and surveillance systems, flight time of pilots, the robustness of air defense assets, and information-dominance as well as many other factors have to be taken into consideration in assessing air power capabilities. In the case of North Korea and China, modernization of their fixed-wing aircraft faces major budgetary and technological constraints. Additionally, the average annual flight time for North Korean pilots is estimated to be some 30 hours, compared to nearly 200 hours for the ROKAF (or near the NATO level) and between 170 and 200 hours for the JASDF. While North Korean pilots are believed to receive extensive simulation training, the fact that its pilots fly less than four hours per month means that its overall air combat capabilities have diminished significantly over the last decade. In addition, Primary Authorized Aircraft (PAA) data or similar figures for Northeast Asia's air forces suggest that the Chinese and North Korean air forces confront more serious upgrade, modernization, and maintenance challenges than the more advanced air forces such as the ROKAF, the JASDF, and most certainly, the USAF.¹⁹

Nonetheless, although there are disparities in the respective air power capabilities of the key regional actors, they all are likely to continue to modernize their air forces, including selective power projection systems. In the long run, the rationale for maintaining a large ground force by most of the East Asian powers is likely to decrease. To be sure, the Korean peninsula remains an exception, given the positioning of the forces along or near the DMZ and the operational requirements stemming from attrition warfare. So long as a credible threat remains, the ROK is not going to restructure its forces with a greater emphasis on air and naval assets. But in the post-unification era, defense planning has to take into consideration

clear and other WMD programs. See Leonard S. Spector and Mark G. McDonough, *Tracking Nuclear Proliferation* (Washington, D.C.: Carnegie Endowment for International Peace, 1995), pp. 103–107 and Robert D. Blackwill and Albert Carnesale, eds., *New Nuclear Nations: Consequences for U.S. Policy* (New York: Council on Foreign Relations, 1993), pp. 26–28.

¹⁹As an example, the PAA counts reflect what the USAF's inventory can actually utilize in terms of operational force structure. To field a USAF wing of 72 PAA for 25 years actually requires a total inventory of about 130 aircraft since at any one time, some airframes are in maintenance, some are being used for testing and training, and two dozen are needed for attrition replacement. Christopher J. Bowie, et al., *Trends in the Global Balance of Airpower* (Santa Monica, CA: Project Air Force, RAND, 1995), p. 8.

a range of new operational requirements including reduced ground forces.

Similarly, in the short term, China is highly unlikely to downgrade the operational value of its ground forces given its ongoing conflict with Taiwan. Indeed, one of the key areas that the PLA is seeking to increase is its amphibious forces. While the “strategic alliance” announced by President Jiang Zemin and President Boris Yeltsin in 1997 was a significant improvement in Sino-Russian relations, not to mention substantial progress in overcoming border disputes, China will continue to perceive a need to maintain robust ground forces—not only with respect to the Sino-Russian border but to the more than ten borders it shares with various neighboring states.

Nevertheless, China too is not going to ignore air power modernization. While the PLA Air Force (PLAAF) has a huge inventory of some 4,000 aircraft, it is perhaps the least modernized service, especially compared with its neighboring countries. For example, the 3,000 J-6s (the Chinese version of the Soviet MiG-19s) that are the backbone of the PLAAF are based on 1950s and 1960s technologies.²⁰ Given the current Chinese strategic emphasis on “limited local wars,” rapid mobility and firepower for border contingencies are likely to be stressed by the PLAAF. The key problem, however, is that while the PLA recognizes the need to upgrade its power projection capabilities, particularly naval, air, and ballistic missile capabilities, there is a significant gap between its current aircraft inventory and future doctrinal and operational requirements. For this reason, air force modernization has received a high priority in China’s foreign weapons and technology acquisitions, especially those from Russia but also from Israel and other sources.²¹ The perceived need for more advanced air power projection capabilities stems largely from intra-regional features, such as the declining likelihood of large-scale ground wars (with the notable exception on the Korean peninsula) and the corresponding

²⁰Kim Tae-Ho, “New Trends of Air Force Build-up in East Asia: Comparison of China, Japan, and Taiwan,” paper presented in the “First International Conference on Air Power in 21st Century Korea,” coorganized by the Center for International Studies, Yonsei University, the Institute of East and West Studies, Yonsei University, and the Pacific Century Institute, May 22–23, 1998, pp. 17–18.

²¹*Ibid.*, pp. 18–19.

shift towards overcoming gaps imposed by geography.²² Although these two factors can be construed as necessary conditions for acquiring more advanced power projection capabilities, they are not, strictly speaking, sufficient conditions.

NORTH KOREA'S BALLISTIC MISSILES: STRATEGIES AND IMPLICATIONS

For nearly three decades, North Korea has emphasized the development and sale of ballistic missiles and in that period, North Korea has managed to successfully develop, test and partially deploy medium- and long-range missiles.²³ North Korea's missile program began when it became involved in a Chinese program to develop the Dongfeng 61, a 600-km range ballistic missile in the mid-1970s.²⁴ This program was ultimately aborted, but the North Koreans continued to actively pursue SCUD B technology to create a basis for their own in-house ballistic missile program. In 1981 North Korea received a small number of SCUD Bs from Egypt and in the ensuing three years it strived to reverse engineer the system; in 1984 it first flight tested the SCUD Mod A (a copy of the SCUD B).²⁵

As the August 1998 Taepo Dong I test launch illustrated, North Korea has attained significant know-how. "That launch demonstrated some important aspects of ICBM development, most notably multiple-stage separation. While the [U.S.] intelligence community expected a TD-1 launch for some time, *it did not anticipate* that the missile would have a third stage or that it would be used to attempt to place a satellite in orbit." (Emphasis added.)²⁶ To be sure, the North still faces problems with the third stage, so it will take time before it is able to develop ICBM capability (in ranges in excess of 5,500 km); but the test amply showed North Korea's inherent long-range ballistic missile capability.

²²Tellis, Op. Cit., p. 61.

²³*Proliferation: Threat and Response*, p. 8.

²⁴*Ballistic Missile Briefing: North Korea*, (Lancaster: Center for Defence and International Security Studies, October 25, 1997), p. 1. (Internet edition.)

²⁵*Ibid.*

²⁶William S. Cohen, *Annual Report to the President and the Congress 1999*, (Washington, D.C.: U.S. Government Printing Office, 1999), p. 41.

The fact that North Korea has been working on long-range missiles is not a recent or surprising development. According to testimony given by two former North Korean officials, "if war breaks out on the Korean peninsula, the North's main target will be U.S. forces based in the South and in Japan" and Kim Il Sung ordered a crash missile program as early as 1965 to develop missiles that could "fly as far as Japan."²⁷ The two North Korean defectors were former KPA Col. Choi Joo-hwal and former diplomat Ko Young-hwan. In testimony before a Senate Subcommittee, they testified that precision strike capability was not the main objective since North Korean missiles have been built to impact on a given target range such as U.S. bases in South Korea or Japan. Choi testified that the KWP Central Committee oversees the Second Economic Committee, which has eight General Bureaus to produce rockets and chemical weapons. Precise figures of deployment were not given by either Ko or Choi. In addition, Ko stated that North Korea's missile exports are handled by the Yangak-san Trading Company, the Changkwang Trading Company under the 2nd Economic Committee, the 15th Bureau in the Ministry of the People's Armed Forces (MPAF), and the Maebong General Bureau (the Maebong Trading Company) in the General Staff of the KPA. All told, an official at the Maebong General Bureau reportedly told Ko that North Korea earned about US \$1 billion annually from missile exports to Syria, Egypt, Libya and Iran. Ko also testified that North Korea also exports Chinese missiles such as the Silkworm antiship cruise missiles (ASCMs) as middlemen with "enormous" commissions.²⁸

In June 1998, just two months short of the August Taepo Dong I test, North Korea announced that it would continue to develop, test, and export ballistic missiles. This was the first time that North Korea officially acknowledged its missile exports to the Middle East. The official North Korean press agency, KCNA, reported that "if the United States really wants to prevent our missile export, it should lift the economic embargo as early as possible and make a compensation for

²⁷Bill Gertz, "North Korea Building Missiles That Could Hit American Forces," *Washington Times*, October 22, 1997, p. 1.

²⁸"Defectors Give Detail of North Korean Missile Programmes," *Missile News* (November 1997), <http://www.cdiss.org/97nov1.htm>, p. 4.

the losses to be caused by discontinued missile export.”²⁹ North Korea may have been motivated to acknowledge its missile sales in an effort to encourage bargaining with the United States and South Korea, in addition to the short-term goal of disrupting, to the extent possible, President Kim’s slated visit to Washington in June. Tables 10.1 and 10.2 illustrate North Korea’s WMD and ballistic missile arsenal based on available open sources.

The test launching of the Taepo Dong I created widespread concern in Seoul, Washington, and Tokyo, although Japan’s initial reaction was much sharper than South Korea’s. Japan was outraged that a part of the missile flew over Japanese territory and immediately took retaliatory steps. Tokyo halted food and other aid to

Table 10.1
North Korean NBC Weapons and Missile Programs

Nuclear	Signed Agreed Framework in 1994 freezing nuclear material production. Prior to agreement, produced enough plutonium for at least one nuclear weapon.
Chemical	Produces and is capable of using variety of agents and delivery means, which could be employed against U.S. or allied forces. Has not signed the CWC.
Biological	Pursued biological warfare R&D for many years and possesses biotechnical infrastructure capable of supporting limited biological war. Ratified the Biological and Toxic Weapons Convention.
Ballistic missiles	Produces and is capable of using SCUD B and SCUD C missiles. Developing the No Dong missile (approximately 1,000 km), Taepo Dong I (more than 1,500 km) and the Taepo Dong II (between 4,000 and 6,000 km). Not a member of the MTCR.
Other means of delivery	Land- and sea-based antiship cruise missiles; none have NBC warheads. Aircraft and ground systems (artillery, rocket launchers, mortars, and sprayers).

SOURCE: Office of the Secretary of Defense, *Proliferation: Threat and Response*, (Washington, D.C.: U.S. Government Printing Office, 1997), p. 5.

²⁹Kevin Sullivan, “North Korea Missile Disclosure,” *International Herald Tribune*, June 7, 1998.

Table 10.2
North Korea's Missile Characteristics

Class	Name (Alternate Names)	Max. Range (km)	War- head (kg)	Stages	Length (m) [a]	Diam- eter (m)	Weight (tonnes)	DPRK IOC [b]
RBMS	SA-2/ HQ-2 SSM	150– 200	190	2	10.7	.65/.5	2.287	1976
	DF-61	600	1,000[c]	1	9.0	1.0	6.0	n.a.
	SCUD B (R-17E)	300	1,000	1	11.164	.884	5.86	1981
	Hwasong 5 Prototype (SCUD Mod. A)	300	1,000	1	11.164	.884	5.86	1984
	Hwasong 5 [d] (SCUD Mod. B, SCUD B)	320– 340	1,000	1	11.164	.884	5.86	1985
	Hwasong 6 [d] (SCUD Mod. C, SCUD C, SCUD PIP)	500	770[e]	1	11.3	.884	5.93	1989
	No Dong (No Dong I, Rodong 1, SCUD Mod. D, SCUD D)	1,350	1,200[f]	1	17.4	1.32	16.25	1997
RBMI	Taepo Dong I (Daepo Dong I, No Dong II, SCUD X, SCUD Mod. E, Rodong 2)	1,500– 2,20[g]	700– 1,000	2	27.3 (16.3/1) 1	1.32/ .884	20.4	1998
CBMI	Taepo Dong I SLV	4,000[h]	50– 100	3	27.9 (16.3/8. 1/3.5)	1.32/ .884/ .884	19.9	1998
	Taepo Dong II (Daepo Dong 2, No Dong III)	4,000– 6,000	700– 1,000	2	35.4 (18/ 17.4) [i]	2.4/ 1.33 [j]	69.4	2000

Table 10.2
Continued

Notes: Figures for all DPRK-produced systems are based upon the best "open source" information currently available and should be regarded as provisional.

[a] Figures are for first and second stages, respectively.

[b] DPRK IOC: Initial operational capability. The DPRK places missiles systems into service decidedly earlier in their development phase than do most other nations.

[c] The PRC planned a domestic version with a 1,000-km range and a 500 kg nuclear warhead.

[d] Hwasong translates to Mars.

[e] Several sources suggest that the Hwasong 6 warhead weighs 700 kg.

[f] Warhead weight is believed to be between 1,200 and 1,500 kg. This estimate is based upon Iranian statements that the Shahab 3 warhead "... can carry at least 1,200 kilos of explosives. ..." The Shahab 3 is essentially a direct copy of the No Dong.

[g] Earlier range estimates were 1,500–2,000 km.

[h] The best information currently available suggests that during the recent Taepo Dong 1 SLV launch the payload, or debris from the payload, traveled approximately 4,000 km. When employed as a ballistic missile, a space launch vehicle (SLV) capable of placing a 100-kg payload into low earth orbit (LEO) is theoretically capable of delivering a 200-kg warhead to a range of approximately 10,000 km. This is assuming a launch trajectory due east.

[i] These figures represent a missile that is constructed of an entirely new first stage that is 18m in length and a second stage consisting of a modified No Dong. Previously published estimates have suggested a total length of 32m. The first stage being 18m and the second stage 14m.

[j] If the first stage is composed of three No Dong engines the diameter would be closer to 2.8m

SOURCE: Joseph S. Bermudez, *The Armed Forces of North Korea*, (Sydney, Australia: Allen & Unwin, forthcoming).

The test launching of the Taepo Dong I created widespread concern in Seoul, Washington, and Tokyo although Japan's initial reaction was much sharper than South Korea's. Japan was outraged that a part of the missile flew over Japanese territory and immediately took retaliatory steps. Tokyo halted food and other aid to North Korea and also decided to suspend normalization talks although they were already broken off by the North Koreans. Japan's Self Defense Forces sent three naval vessels and P3-C patrol aircraft. Prime Minister Obuchi stated that "the missile launching concerns not only the security of Japan but also the whole of Asia."³⁰ While North Korea announced a few days after the missile test that it was a satellite and subsequent analysis by U.S. analysts indicated that a satellite was probably launched but failed to orbit successfully, it nevertheless revealed North Korea's significant progress in the development of long-range missiles.³¹

In contrast to Japan's surprisingly speedy response, the South Korean government, other than expressing outrage and shock, did not really take any retaliatory actions. Then Minister of Defense Chun Yong Taek stated that "we will respond forcefully through the cooperative efforts of the ROK, the United States and Japan" and that the national security council would review other steps.³²

In the aftermath of the test, officials in South Korea and abroad expressed concern about the possibility of accelerated development of the longer-range Taepo Dong II. Analysts have stated that the Taepo Dong II has similar characteristics as the Chinese Dongfeng-3 (CSS-2) with a range between 3,500 and 6,000 km. These estimates, if true,

³⁰"Tokyo and Seoul Outraged by North's Missile Test," *International Herald Tribune*, September 2, 1998, p. 4.

³¹Various explanations have been given for North Korea's missile test including the celebration of Kim Jong Il's official elevation as "Great Leader." What was interesting was that many analysts in Seoul and abroad, while recognizing the dangers posed by North Korea's ballistic missiles, still continued to perceive the launch as essentially non-threatening. For example, Leon Sigal wrote in November 1998 that "the launch was more likely an unsuccessful attempt to mark Kim Jong Il's formal accession to power by boosting a small satellite into space than a brazen act of intimidation aimed at Japan. Over reaction to the test will impede diplomacy, which is the most promising way to curb Pyongyang's missile program." Leon V. Sigal, "For Sale: North Korea's Missile Program," *East Asian Security*, <http://www.nyu.edu/globalbeat/asia/Sigal111198.html>.

³²*Chosun Ilbo*, September 1, 1998.

mean that North Korean missiles have the potential to target the Aleutian islands and parts of Alaska. However, debate continues on whether North Korea has the ability to develop, test and ultimately deploy the Taepo Dong II. Indeed, some have argued that the primary reason behind North Korea's missile program is to essentially negotiate it away at a price based on three points: (1) North Korea has been engaged with the United States to discuss curtailing its program in return for some type of compensation; (2) North Korea was engaged in similar negotiations with Israel in 1992–1994 and almost reached a deal but U.S. pressure on Israel stopped the deal; and (3) as the Agreed Framework of 1994 demonstrates, North Korea is able to negotiate a major WMD program.³³

Nevertheless, such an assessment does not take into consideration the underlying strategic motivations behind North Korea's missile program. If North Korea was principally interested in negotiating away its missiles, it is very doubtful whether it would have begun work on its program nearly three decades ago. Clearly, objectives may change under different circumstances. But neither Seoul nor Washington is likely to buy off North Korea's ballistic missiles. In previous U.S.–North Korea missile talks, Pyongyang has demanded \$1 billion each year for up to three years to compensate for its export sales to the Middle East. Officials estimate that North Korea's missile sales may have generated significant earnings in the late 1980s to the early 1990s but that it has averaged only about \$100 million since 1996–1997. In the latest round of talks held in Pyongyang from March 29–April 1 (the fourth since talks began in 1996), both sides were unwilling to give up their basic positions.³⁴

The South Korean government continues to hope that North Korea will ultimately accept a comprehensive package proposal that has been transmitted to the North. One cannot discount such a possibility, but in all likelihood Pyongyang is unlikely to accept a package deal. Why? Because its WMD and ballistic missile programs offer North Korea the best opportunity to buy time in order for the regime to consolidate its hold on power, to receive additional foreign aid,

³³David C. Wright, "Will North Korea Negotiate Away its Missiles?" *Global Beat Policy Forum Online* #16, pp. 3–4.

³⁴*Chosun Ilbo*, April 2, 1999.

and to prevent a deterioration in the overall "correlation of forces" between the South and the North. According to a South Korean report in March 1999, at least four missile-producing factories have been confirmed to be in operation in the North with the ability to produce more than 100 SCUD C missiles annually.³⁵ In addition, a South Korean intelligence official stated that 10 missile launch sites had been confirmed in the North with two new bases that were under construction and that three sites appear to be aimed at Japan. If these reports are true, North Korea's ballistic missile program can be understood only in the context of a comprehensive strategic policy. North Korea's primary strategic utility stems from its ability to threaten the political, economic, and military integrity of the ROK. If North Korea willingly defangs itself, there is little or no incentive for the ROK or the United States to take North Korea seriously.

SUMMARY

The ROK, the United States, and Japan continue to grapple with the advent of North Korea's ballistic missiles, although each have contrasting interests and approaches. For the United States, North Korea stands out as the principal proliferator in the Third World in addition to other outstanding threats posed by its WMD programs. An active counter-proliferation policy such as theater missile defense (TMD) has been pushed as one response to the threat posed by North Korean missiles in addition to China's growing missile arsenal, particularly vis-à-vis Taiwan. Nonetheless, South Korea has decided not to participate in a TMD program on the basis that the more serious threat stems from North Korea's long-range artillery that is poised along the DMZ. The current government's official position is that South Korea's mountainous terrain, the proximity of Seoul to the DMZ, and diplomatic concerns mean that participation in a TMD system is premature and perhaps even imprudent. For its part, Japan has already been engaged in TMD architectural studies, although it remains to be seen how far Tokyo is willing to commit financial resources into a comprehensive TMD system.

³⁵Lee Sung-yul, "North Korea Operates at Least 4 Missile Factories, 10 Launch Sites, Official Says," *Korea Herald*, March 26, 1999.

For the ROK, North Korea's missile threat is not a tactical concern, although the government has continued to emphasize the importance of not "over inflating" the missile issue for fear that it could derail efforts to achieve a breakthrough in South-North relations. Such a view, however, is both myopic and wrong. Although South Korea doesn't have the technological capability or the financial resources to participate more actively in a TMD system, at a minimum, the ROK should procure Patriot SAM or equivalent systems. At the same time, the ROK should expedite discussions with the United States in order to ensure that while the ROK will abide by the provisions of the MTCR, Seoul is no longer bound by the bilateral understanding that expires at the end of 1999. South Korea has the right to develop its own ballistic missiles within the confines of the MTCR in order to have offensive deterrence capabilities against an array of North Korean missiles. Bargaining or negotiating the North Korean missile threat is a policy option that is unlikely to result in tangible benefits since North Korea's WMD program lies at the core of its ongoing efforts to create a *Kangseung Daeguk* or "Strong, Great Nation" under the tutelage of Kim Jong Il.

In the final analysis, North Korea's ballistic missile program cannot be divorced or separated from the central characteristics of the regime or its fundamental strategic objectives. It could be argued that if that were the case, North Korea would not have agreed to a freeze in its nuclear weapons program. But it is critical to remember that the Agreed Framework is part of a long-term process with as yet uncertain outcomes. Unless and until the North Korean regime significantly alters its strategic goals toward the ROK, Japan, and the United States, it remains doubtful whether engagement and a package deal will result in a breakthrough. At its heart, North Korea's ballistic missile programs, like its WMD ambitions, are reflective of the regime's deeply ingrained hostility toward South Korea. Unless and until this basic dimension changes, the ROK has to continue to live under the threat of North Korea's ballistic missiles.

**TMD ARCHITECTURES IN EAST ASIA: MILITARY
AND POLITICAL ALTERNATIVES
FOR REDUCING THREATS**

Thomas Morgan

INTRODUCTION

This chapter makes three main points:

- The Regional Threat and Theater Missile Defense

South Korea's adversaries may deliver weapons of mass destruction (WMD) by a variety of means, only one of which is by theater ballistic missile. WMD has been recently expanded by the U.S. government to include chemical, biological, nuclear, and advanced conventional munitions. Ballistic missiles can consistently deliver only some of these weapons in a threatening manner and it is important that the ROK separate real threats to its security from potential threats. Only in this way can it appropriately allocate its defense resources.

- Balancing Threat Response and Counterproliferation

Once a justification for the theater ballistic missile threat is provided, ROK defense planners need to incorporate the full spectrum of available defenses into their response and to optimize this response against individual components. Theater missile defense or "active defense" is one leg of a multitiered counterproliferation program that includes "passive" defense, "counterforce" or attack operations, and command control and intel-

ligence (C³I). The active defense component performs best if all of these tiers operate in full harmony with the other components.

- Constructing a TMD Architecture as One Pillar of the Counterproliferation Response

Theater Missile Defenses perform at their optimum levels when they work in concert with other elements of counterproliferation planning. Fresh intelligence of missile launches to cue radars, overhead imagery of launcher orientation to indicate launch azimuth and launch corridors and satellite communications networks with secure information exchange protocols all assist theater missile defense function properly.

THE THEATER MISSILE/WMD THREAT AGAINST THE ROK

In the political context, the North Korean missile arsenal poses the gravest autonomous threat to South Korea because the North Koreans may use their missiles episodically and with impunity. While China and Russia possess nuclear arms, and the missiles to project attacks against the ROK, these countries have little incentive at the present time to use such weapons outside of a Superpower conflict. As both the Gulf War and Kosovo demonstrate, such conflicts arise over a period of months permitting the belligerents the time to prepare defenses and deploy men and materiel most effectively.

If North Korea chooses to support an invasion of South Korea with WMD and does so with no warning, then it has several avenues available for the delivery of this attack. Though South Korean air defenses can detect and deflect most and probably all North Korean aircraft attacks with little outside support, the enormous size of the North Korean special operations forces makes these troops a potent delivery means, particularly for nonpersistent chemical and biological agent attacks. Conversely, it has been U.S. research experience that ballistic missiles provide an extremely inefficient method to deliver chemical and biological agents. Missile flight operations and dispersion methods make it difficult to spread the agent in the proper concentration thus significantly diminishing the agent's lethality. Methods to counteract this problem such as submunitions effectively reduce the delivered payload of the missile to minimal levels.

With these considerations in mind, a North Korean target planner who sought to make the most effective missile attack against South Korea would probably elect to arm the missiles almost exclusively with nuclear and persistent chemical agents. Such logic should not exclude the possibility that a ballistic missile can deliver any WMD payload, and such an attack could occur at any time. But such attacks have little military value to the attacker and would not advance many military objectives on the part of the North Koreans. In these cases, the attack would only hamper subsequent management and civil defense efforts on the part of ROK civil authorities.

Correspondingly, if the North Koreans sought to achieve a military aim, they have a selection of targets to choose from, but because of proximity and their isolation in the region, they have only two or three attractive launch corridors available to them. This allows the defense to focus its detection and interceptor assets in certain key regions.

TM/WMD TARGETING STRATEGIES

Broadly, a country that attacks the ROK with theater missiles will seek to advance several objectives. The most prominent of these objectives is to slow or delay arrival of U.S. assistance in the form of troops and equipment. Beyond that, North Korea may also interfere with the mobilization of the ROK military and disrupt civilian resupply of critical items. As a conflict progresses, North Korea may evaluate the military situation and use its missiles against any vital infrastructure target, either military or civilian, that it deems harmful to its advance. In many cases, North Korea must choose these targets selectively. Because North Korea risks overrunning its supply lines in any advance on South Korea, the country undoubtedly expects to use the existing South Korean infrastructure as a source of new supplies. Therefore, it can attack only those targets that do not hamper its own expectations for resources. And finally near the end of the conflict, North Korea may, as Saddam Hussein did at the end of the Gulf War, reach a point of desperation and simply use WMD in retaliation or as a means to cover a withdrawal.

Any of these attacks have both military and civilian repercussions and a targeting logic. Again, North Korea has no reason to follow any particular course of action to release its WMD, or to agree with the

logic of this discussion. But some attacks will be significantly more effective than others, and it is the effective attacks for which ROK forces must prepare. To discuss these attacks within the context of missile defense, then, this chapter presents four strategies that might produce some military effect.

First, before a significant number of U.S. troops arrive, North Korea may choose to launch a missile attack on civil and cultural institutions with biological agents in order to vacate the civilian population. Employing biological agents aboard a ballistic missile would likely produce few casualties, but a population fleeing from such urban centers as Seoul would move south into the countryside and clear a path for an army advancing toward the capital. Once word of the attack spread, panic would undoubtedly ensue which would require local authorities to develop plans for an immediate evacuation. The traffic load would encumber the military and public safety officials, causing a significant redirection of resources. In order to prevent this panic, the population must believe that theater defense interceptors can prevent the attack, the missiles are placed adequately to prevent an attack against urban populations, and enough interceptors exist to overcome any launch rate that the North Koreans might contemplate. If the attack yields few casualties, and if it occurs early in a conflict before the United States has had time to commit itself to a buildup of troops in the region, the North Koreans may calculate that the United States and the ROK may not respond with a massive retaliation against the North. In this case deterrence may not have an immediate suppressive effect.

The second and third strategies envision that the North Koreans may wish to deny U.S. forces any opportunity to resupply its troops in place or to bring more equipment into the country. In this case they will target points of embarkation such as ports and airfields. The focus of this attack would be both civilian and military, and candidate targets include Seoul, Inchon, and Pusan. North Korea could deny or delay the arrival of U.S. troops at major ports through the use of persistent chemical weapons. It might time the weapons delivery in three- or four-day increments prior to a massive invasion, and consistently launch missiles to force defenses into chemical protection suits which would diminish the operations tempo of the U.S. and ROK forces. Again, if North Korea launches its missiles preemptively, it may have reasoned that the United States would not

have the resources available to conduct a campaign of massive retaliation. If the attack proved effective, the North Koreans might believe it would prevent the United States from staging a campaign from South Korea because it could not move the aircraft and armaments into place to continue. In addition, it might prevent the United States from using Japan as a staging ground because Japan would not want to invite a similar attack on its soil.

Finally, in the fourth strategy, North Korea may be beaten back at the end of a conflict and feel a need to retaliate with its nuclear weapons. By this stage in the conflict North Korea may be left with only theater missiles as a means to launch an attack that it believes will survive all of the existing air defenses. With no purpose for saving the South Korea infrastructure to use for its own troops, and facing the prospect of the type of devastation that the United States visited on Belgrade and Kosovo, it may launch nuclear weapons simply to justify the construction of the weapons in the first place. In this scenario, North Korea desires to exact the most humiliating revenge possible against the South and its U.S. partners and chooses Seoul as the best target for a nuclear attack. By this time in the conflict the United States will surely have in place all existing missile defense batteries, intelligence-gathering means, and supporting equipment to make the defense effective.

CHRONOLOGICAL AND GEOGRAPHICAL TARGETING PROBABILITY

In this region, missile arsenals exhibit four distinct performance and targeting characteristics, which must be considered in the evaluation of the ROK's missile defense needs. These considerations in turn dictate logical targeting philosophies and the sequence in which the targeting might occur to be effective. The four considerations are: the individual range of the missiles; the quantity of missiles that can be launched either serially or simultaneously; the quality of the attack strategy including simultaneous attack azimuths that must be defended; and the ability of the warhead to evade defenses.

Normally, the range that a missile flies determines the velocity with which it will reenter the atmosphere. This, in turn, establishes an upper limit on the velocity that an interceptor must possess in order

to effectively engage it. By first order engagement calculations, existing missile defenses, whether Russian or U.S., have the kinematic ability (but perhaps not the agility) to intercept missiles reentering at a velocity of 1.9 km/sec which corresponds to roughly 600 km in range. Poorly designed reentry bodies (those with low ballistic coefficients) slow significantly as they penetrate the atmosphere and in some cases a longer-range missile may be vulnerable to interception if the defenses wait as the warhead approaches and slows before attempting the interception. On the other hand, this entails the risk that fragments or WMD material may spill over the target in the post-engagement debris. If defenses exist, then longer-range missiles allow a threatening power to launch an attack at any time during a conflict.

The SCUD family of missiles and its derivatives represent low ballistic coefficient reentry, which most existing defense can engage.

If a nation seriously contemplates a sustained missile attack in order to saturate missile defenses, it must also have a quantity of missiles in its arsenal to support those objectives. In this regard, the different types of WMD influence the number of missiles that are needed to obtain a desired result, the geographical location from which they are launched, and the order in which they will be launched.

Surely only one nuclear weapon is required to make an effective attack. But depending upon purpose and the duration of a conflict, the North Koreans may desire to occupy territory in South Korea. This may preclude an early nuclear strike if the target is in an area the North Koreans wish to occupy to their advantage. Nuclear armed theater missiles offer no particular advantage to a military operation when the intention of the attack is conquest and most probably will not be used until the late stages of a conflict that is going badly for the attacker.

On the other hand, chemical and biological weapons require scores of missiles to achieve an objective. North Korea's most likely objective in this scenario would be to preclude force augmentation from the United States. Since the United States must use ports and airfields to bring men and equipment into the theater, chemical missile attacks most efficiently accomplish this goal if they are used in the opening days of a campaign. Ironically, this may occur when missile

defenses are thinnest because part of the equipment the United States will provide to the theater is defense interceptors.

Other elements of the defense, such as attack (counterforce) operations against launch bastions, may mitigate this threat. Because the geography of Korea presents two attractive targets, Pusan and Seoul, attack operations planning could help eliminate those bastions, which might target Pusan with longer-range missiles only.

In order to sense and target a missile within the time required to engage and defeat it, defenses must detect the warhead or missile body, calculate an interception path, and discriminate the warhead from other objects or debris whether deliberately or accidentally accompanying the warhead. Since the SCUD-B does not separate from its warhead, it has the largest radar cross-section of all the threat missiles within North Korea. Separating warheads naturally complicate the problem of targeting, because they reduce the time that a defense has available to *autonomously* detect and track a threat. Other cueing technologies, if they are available, partially mitigate this concern.

The radar cross-section argument would suggest the use of SCUDs at the earliest moment in a conflict when missile defenses are thin. It may also mean the North Koreans could find this a particularly potent weapon to use in a salvo attack to draw fire and deplete defense batteries when the defense battle management is poorly thought out or incapable of making judicious discrimination of the threat.

SATURATION THREAT TO ACTIVE DEFENSES

In the event that North Korea decides to launch a theater missile attack late in a conflict when the allied defenses are in place and expected to perform near their design specifications, it must somehow evade or otherwise defeat these defenses. As North Korea builds a larger arsenal of missiles, one method at its disposal is to simply overwhelm the interceptor capacity of the defense by a salvo or simultaneous launch. Salvo launches create problems of inventory depletion with very thin defenses. In most cases, allied batteries deplete their inventories because an effective battle management doctrine does not exist for multiple launches. Individual batteries fire

all of their missiles when the defender doesn't know the full scope of the threat and overcommits interceptors to perceived targets. As the Gulf War showed, the defender must use two and sometimes three interceptors for each incoming missile in order to be assured of a kill. Moreover, when an attack empties an individual battery of its interceptors, the attacker can then choose to use WMD with no fear that the missile will be intercepted.

Two-on-one defense targeting also raises the specter that multiple or simultaneous launches on the part of the attacker can force a country to reload as a missile war progresses. This threat depends upon the launch capability of the attacking power. Often the launch site determines the size of any launch cohort during a simultaneous or salvo launch. If a country chooses to launch from mobile launchers in order to disguise its intent or disperse its forces to make them less vulnerable to counterattack, then it must have as many TELs as missiles in the launch cohort. In general, a country keeps on hand about one TEL for every ten missiles, though by no means is this a steadfast rule. Additionally, a country can launch more solid missiles in sequence from a given TEL than it can liquid missiles. So the North Korean threat, composed as it is largely of liquid missiles, may be slightly diminished from that of a country possessing solid missiles.

Salvo attacks pose difficulties for the attacker as well. If North Korea plans to make a well-timed, coordinated salvo launch to arrive at the target simultaneously, the country must be prepared to support it with an adequate fleet of TELs, a method to communicate with commanders in the field, and a knowledge of the target defense state of readiness. These arguments might also require a well-buried missile bunker infrastructure, and this would seem to fit well with North Korea's capabilities. But at some point the country must bring its missiles into the open to fire them and if the conflict has progressed for any amount of time, then the U.S. and ROK air forces can be expected to enjoy air superiority. This would allow them to target fixed sites and probably destroy the missiles during their launch preparations. Alternatively, as the Gulf War proved, the difficulty in locating and destroying mobile targets makes mobile assets much more valuable in a war against the United States and its allies. An increase in North Korea's TELs is in some ways more threatening to the ROK missile defenses than an increase in the quantity of the missiles.

In any attack, a defense battery uses multiple interceptors for each threat object, which may be a missile or a decoy. The defense battery must reload sooner than a fleet of TELs must obtain newer missiles. In terms of economics, the advantage accrues to the attacker.

North Korea may need to launch as few as ten missiles simultaneously against Seoul before it exhausts one defense battery. Because point defenses must cover every target of value, and the ROK may have a limited number of batteries available, or they may still be in transit from the United States, no more than one or two targets can be adequately covered. Defenders have to decide which of various points within a roughly 40-km radius merit more than one defensive battery.

THREAT OF MULTI-POINT TARGETING

South Korea is fortunate in its location with respect to its potential adversaries. If North Korea remains the single combatant throughout a conflict and China does not enter into any confrontation, then the threat corridors that South Korea must defend become quite limited. North Korea may choose to attack either the southern or northern reaches of South Korea. But as its range capability has expanded, it can now move its missiles largely throughout its own territory at will to strike these targets. Still, North Korean geography denies the country the critical strategic element of using multiple launch azimuths to attack a defended zone from several directions. This allows the South to place its early warning radars and intelligence gathering assets in key locations and enjoy a near certainty of detecting a North Korean launch. If China or another country appears poised to join a conflict on the side of the North Koreans, the United States can also be expected to supply key intelligence information, launch detection from overhead assets and other critical defense information to the ROK.

Even expecting sophisticated targeting strategies, as few as three hundred interceptors may be adequate to cover the worst case scenarios of multiple trajectories. These interceptors need to be distributed evenly throughout the principal targets of Seoul, Inchon, and Pusan, with perhaps two hundred in the Seoul-Inchon area and the remainder in the Pusan area. Logistics planners need to be

prepared to redistribute these interceptors as required during a conflict.

The North Korean missile arsenal needs to be carefully and certifiably monitored by all sources of intelligence in order to ensure that the ROK maintains an adequate inventory of defense interceptors at all times.

ATTACK REQUIREMENTS

Within the four broad categories of ROK targets, and a supporting political or military strategy, North Korea has widely different capabilities to achieve its goals. A nuclear attack requires the fewest missiles, and because a nuclear weapon has such a devastating lethality, a simple impact fuze will suffice to construct a complete weapons package. The reliability of North Korean missiles and its nuclear warheads undoubtedly varies across a wide range, but most unclassified military analysts believe it has not yet attained a combination of reliable missiles and reliable warhead detonation techniques in order to attack a target with confidence using fewer than five missiles. This reduces the threat of a salvo launch exhausting batteries since all of the nuclear warheads North Korea could possibly possess in worst cases scenarios would have to be armed and ready to launch simultaneously. Even with the spotty record counterforce operations have for finding and eliminating TELs, North Korea would still have to plan to lose one or two TELs as it prepared for a salvo nuclear attack. Certainly no more than five such nuclear-armed missiles are required even when facing missile defenses of current capabilities given the best estimates on interceptor kill probability.

At the other end of the spectrum, if North Korea plans to deny the use of a large area of enemy territory by means of a chemical weapons attack, it must be prepared to consistently reintroduce the agent into the theater of war about once every three days. It must also be technologically capable enough to weaponize the warhead in such a way that it explodes in the air but below the boundary layer and the warhead has a mechanism to disperse the agent over as large a radius as possible. Provided North Korea has met or will soon meet these weaponization challenges, it can surely produce all of the chemical agents it needs to support an attack, and so the limiting

factor to its strategy is the number of missiles it has available. In this case North Korea is limited by the CEP of its missile arsenal as well. Assuming the lethal radius of a chemical attack is roughly half of the CEP of its missiles, North Korea must launch four to eight chemically armed missiles for every target it seeks to eliminate from use. Its current arsenal allows it to target roughly three point locations every three days for eighteen days.

The threat of reintroduction of chemical agents by North Korea can be ameliorated by a vigorous and well-coordinated civil defense plan. As the Gulf War proved, the usual civil defense practices of decontamination and distribution of suits and gas masks quickly mitigate the threat of a chemical agent attack, at the cost of a reduced level of operations for the defenders. Most projections of chemical attack assume that the North Koreans use another means to deliver the munitions; and indeed if theater ballistic missiles are the only effective means, then the defense can easily pay the price of reduced operations for these eighteen days. Several dozen, up to as many as several hundred, missiles may be required to support any prolonged campaign of chemical attack.

Biological agents fall midway between these two extremes. The increased lethal radius of a biological agent compensates for its short-lived effect. Biological weapons seem to have a more pervasive psychological effect as well, which could contribute to collateral confusion and fear on the part of the population under attack.

OBSERVATIONS ABOUT THE TMD THREAT

- Long-range (Taepo Dong II) missiles have little application against the ROK.

Long-range missiles offer the advantage of increasing the interception velocity and thereby defeating less capable defenses and providing more room for an adversary to hide the mobile or fixed forces with which to launch an attack. But the geography of the Korean theater argues against these two considerations. With fairly conventional-range missiles, North Korea can reach most of South Korea. It may use the additional velocity that long-range missiles provide to fly a faster trajectory to the target and defeat defense with high interception velocities. But such plans in-

crease the CEP by a significant amount and may make targeting so imprecise as to make the theater missile useless in the first place.

- Chemical/biological warheads on theater missiles have little application against the ROK.

North Korea has so many better alternatives available to it for delivering WMD that a missile strike should be regarded as a last resort. The missile impact dispersion, loss of agent viability, and unclear meteorological conditions at impact, make alternative deliveries by SOF-carried sprayer or ground vehicles more deadly. Ballistic missiles may be used when North Korea has exhausted all avenues to deliver its chemical/biological WMD.

- Saturation attacks can overwhelm TMD defenses.

In the event North Korea chooses to deliver one high-value warhead, it may choose to draw fire from defense batteries and launch its WMD attack when all defense interceptors are removed or the battery is idle while troops reload its interceptors.

TMD SUPPORT FROM THE FOUR PILLARS OF COUNTERPROLIFERATION

The United States originally conceived of counterproliferation support to the Korean theater as a multitiered effort with the strategy of thinning ballistic missile threats through four layers of defense known as the “four pillars of counterproliferation.” Each of these layers individually contributes to an overall defense that mitigates but does not completely eliminate the consequences of the use of WMD.

When the defense considers various scenarios for an unfolding conflict such as those described, it is clear that some elements of the four pillars do not immediately assist in countering WMD. For instance, the most effective North Korean method of using chemical or biological weapons, application by special operations forces that have infiltrated the country, cannot be overcome by theater missile defenses. Only if the North Koreans conduct a coordinated and long-term campaign of missile bombardment will active defenses (TMD) have a role to play. Similarly, the active defenses may be rendered

ineffective against a nuclear attack if the North Koreans plan the attack in such a way as to defeat the defenses by high interception velocities and low signatures (both created by separating warheads) or by overwhelming numbers of ballistic missiles.

The air power element, though, as used in counterforce operations remains critical regardless of the WMD-“use” scenario. In this regard the air power arm of the ROK forces should plan to use all of its capabilities to the fullest extent. Attack planning requires appropriate weapons, a secure command and control network that provides real time bomb damage assessment to prevent flying useless sorties, and the ability to retarget attack and support aircraft in flight.

The Korean theater presents one of the most difficult challenges to this concept of layered defense because many of the technologies developed for the entire counterproliferation effort do not have specific application against North Korea. For instance, the United States developed new air power weapons for attacking shallow and lightly buried storage bunkers. North Korea maintains a tunnel and storage infrastructure that is buried well beyond the reach of these weapons. In the same manner the United States developed overhead cueing networks that pinpoint exact launch locations. These launch locations would identify TEL setup sites and provide target coordinates to an attacking aircraft before the TEL could be moved from the area. The ROK can work to facilitate the application of these technologies within its own air power infrastructure if it develops an operations concept for targeting threat bastions in an efficient manner. Then it can examine which of the technologies it can acquire reasonably on its own and which technologies can be supplied by its potential allies.

DEFENSE INFRASTRUCTURE—OVERHEAD CUEING

During the Gulf War the United States learned that the defense battery alone did not provide sufficient warning of an incoming threat. The Iraqi SCUD-C variant missiles flying on longer ranges and with a reduced radar cross-section because of their breakup needed more than the 80 kilometers of warning that the defense ground-based radars provided. Without at least 150 kilometers of warning the battery could not build the proper track file and calculate an interception trajectory. The United States compensated for this by using its

network of launch detection satellites to cue the ground-based radar to search for the threat in a preferential direction. Now such cueing is required to make any ballistic missile defense battery operate properly. As a statement of the importance of this cueing, Secretary of Defense William Cohen announced in March that the United States would share early warning with the states of the Gulf region.

In order to contemplate effective missile defenses, first and foremost a country needs a system to cue its defense batteries at the earliest possible moment. This allows it to employ the best possible defense strategy. Because of the geography of North and South Korea and the proximity of Seoul to the DMZ, this cueing is unlikely to result from the forward placement of detection radar. Almost certainly the ROK must use overhead cueing in the same manner as the United States did in the Gulf War. One other possibility is to participate with the United States in sea-based Aegis-style cueing off the shore of North Korea. But this requires a joint command-and-control structure with the United States and the forward placement of cruisers before the onset of a conflict. In the event of a surprise attack, a North Korean missile campaign would be particularly effective if U.S. ships had not yet assumed their detection positions.

The United States maintains the Defense Support Program satellites to accomplish early warning and the Russians use the OKO ("eye") network. For now, the reproduction of these systems is beyond the means of most regional powers and so a cooperative data sharing arrangement is required with one of these two powers.

COUNTERACTING DEFENSE SATURATION

With the North Korean missile threat configured as it is, battle management in a ballistic missile defense has to be very capable, and it has to be well choreographed as the battle unfolds. Three critical issues influence the quality of the defense: (1) missile numerical allocation, (2) missile type allocations, and (3) defense battery allocation.

Each of these battle management variables requires a sophisticated intelligence network that realistically assesses the numerical quantity and quality of each threat engagement and the prospect for future attacks based on a knowledge of the total North Korean missile in-

ventory. Battle management information and support comes from overhead imagery of the state of readiness of various missile launch bastions and possibly the direction of the aim point. In this manner the defense batteries may have some prediction of the total traffic and the type of that traffic including decoys and associated objects that each battery must handle. With this information the battery can allocate interceptors and hand over signals properly. Foreknowledge of the launch azimuths also allows a realignment of the ground-based defense radars along preferential threat corridors.

Interceptor numerical allocation depends upon the defense appreciation of the entire arsenal that may be launched and the rate at which that arsenal will be launched. When such an appreciation exists the battle manager parcels out interceptors as the order of battle merits. When mixed defense capabilities such as both THAAD and PAC-3 exist in one theater, any booster typing allows the battle manager to allocate interceptors in a manner to match the performance of the threat and thereby optimize. Patriot interceptors are not drawn down unnecessarily against air-breathing threats such as strike aircraft if another system such as the Hawk is available to counteract this threat.

Finally the battle manager must coordinate these efforts across all defense batteries that will be in a theater whether they are possessed by the ROK, the United States, or a third party participating in a coalition conflict. The coordination of these batteries assumes some form of interoperability and a single command and control function usually administered by the host Air Defense or Air Power Command.

C3I—SPACE-BASED ELEMENTS OF A TMD ARCHITECTURE

When a nation such as North Korea develops a deeper understanding of the benefits that accrue from effective attack planning, it uses other assets more fully. This occurred with the Superpowers as they moved to space-based communications systems and photo-reconnaissance satellites. The United States used these systems in order to detect the value of a target and direct fire toward it as the war unfolded. Until the last decade, strategies including “shoot-look-shoot” (striking once, evaluating the damage, and restriking as required to eliminate a target) of necessity entailed a highly

expensive support infrastructure, and only the United States could afford the full breadth of such architectures. The launch costs of a system such as GPS, for instance, which supports precise targeting and revisit planning, is well beyond the means of all but one or two economies. But as this infrastructure becomes commercially available, regional powers can enjoy the same benefits for a fraction of the cost.

The revolution in commercial marketing of satellite products is poised to erase the advantage of the large-scale investment in new technologies of the United States and the former Soviet Union. With four commercial products, the Iridium communications system outfitted with encrypted nodes, Spot or IRS quality visible light imaging, RadarSat radar imaging, and the GPS system, any regional power can essentially reproduce the command and control network of the United States on a highly abbreviated scale.

In this regard, the superpowers have ignored the revolution in military affairs taking place in regions of conflict around the world. During the Gulf War, in one key area, command, control, and intelligence, Saddam Hussein clearly lacked the capacity to affect a comprehensive strategic plan. Since he didn't have the ability to dynamically command his troops as the war unfolded, his strategies could not take advantage of certain aspects of the Coalition warfighting plan. Nor could he count on the kind of intelligence needed to monitor all of the fronts developing against him. But, as communication capabilities emerge in the civilian world, the same lack of immediate knowledge may not recur.

The defense may take advantages of these same systems, using RadarSat for instance, to determine launch azimuths for threat batteries and movement in and out of launch bastions in all-weather conditions.

SUPPORTING ELEMENTS FOR A TMD ARCHITECTURE

The previous discussion argued that air power must be supported by a secure, survivable communications network in order to properly coordinate all air defense operations. As the Kosovo crisis has shown, attacking nations place a priority on removing a terrestrial communications infrastructure from service in order to delay or

encumber the defense and C3I ability of the attacked. The United States has placed a strong emphasis on satellite communications for its defense needs in order to circumvent this possible loss of communications. The United States uses at least three defense satellite constellations known as the DSCS, Milstar, and the UFO-Follow on for a preponderance of military traffic. But even with this enormous traffic handling capacity, traffic during the Gulf War forced the United States to use commercial service providers to augment its defense communications.

If the ROK plans to use ballistic missile defenses capably it must employ all of the elements for this defense. The country has at least eight applications for satellite traffic and sufficient capacity must remain reserved for attack operations and defense battery cueing. Most important among the applications of satellite communication is the delivery of real-time intelligence to air power assets, but other important applications include command conferencing and air/missile defense cueing. If the ROK consumed satellite capacity at the same rate as the United States does to fulfill all of its communications obligations during a conflict, it would need about 35 Mb/sec of traffic handling. Currently, one DSCS satellite supplies 100 Mb/sec of capacity, so this means Korea needs to reserve one-third of an entire U.S. defense satellite or contract for its own defense communications needs in the public sector.

OBSERVATIONS ABOUT COUNTERPROLIFERATION STRATEGY

- Counterforce operations must occur early and effectively against TM launch bastions.

Air counterforce operations form a critical element of any missile defense strategy. The air attack operations should serve to reduce the number of TELs and fixed launch sites that North Korea may use in a conflict. Moreover they need to reduce launch bastions near the intended attack zone to force North Korea to rely on its fewer numbers of longer-range missiles. South Korea can effectively support these air operations objectives with the proper weapons mix on its attack aircraft, all source intelligence particu-

larly from radar imaging systems and photo-reconnaissance satellites to detect early preparations for a launch.

- C3I must assist in battle management.

During the Gulf War the United States learned the lesson of autonomous counterforce operations and has since begun to implement plans to incorporate all assets of a ground-based and space-based C3I structure into the entire counterforce operation. These activities include real-time retargeting of air assets as information becomes available, intelligence cueing of launch preparations and real-time bomb damage assessment of the outcome of attack sorties to prevent needless duplication of targeting. In addition, the shared early warning of actual launches helps to prevent panic among populations.

FUTURE TMD CHALLENGES

Neither missile design progress nor missile defense technology exists in stasis with the other. With simple modifications specifically aimed at building a more threatening arsenal, North Korea can overwhelm current missile defenses. At the same time the United States, Russia, and Israel understand this premise and have embarked upon new missile defense research to overcome limitations in their existing systems. By the end of the next decade, the United States plans to field the THAAD program, Russia the SA-1500, and Israel the Arrow missile defense interceptor.

By performing rudimentary technology research, North Korea may meet new developments in ballistic missile technology with corresponding defense technology. In many cases, the time scale of technology introduction benefits the attacker rather than the defender. The Iraqi al Hussein 600-km IRBM illustrates this point. The missile defense community had a clear indication as early as 1987 that Iraq possessed this missile because of its use in the "War of the Cities." It understood, as well, that the longer-range al Hussein had the capability to avoid the existing Patriot interceptors by virtue of its higher reentry velocity. Nonetheless, by 1991 at the beginning of the Gulf War the Patriot had not been upgraded to deal with this enhanced threat. Only the SCUD-B itself with its enormous drag, which bled velocity away high in the atmosphere, allowed the Patriot to partici-

pate in missile defense. Consequently, the Patriot intercepted the SCUD much closer to its target than originally intended. Had the Iraqis introduced the separating warhead, or used chemical or biological weapons on the SCUD, the Patriot would not have enjoyed the success it did.

At any one time the race between defense and offense technology opens up similar windows to be exploited. These windows have unique technical and geographic characteristics without a universal application. The missile that delivers a threatening warhead against one country does not necessarily have to be the missile that delivers it against another. But the missile defense community rightly builds its interceptors for its primary client. So as the threat evolves in a regional setting it is important to understand whether the defenses also evolve to meet the challenges of the region, or whether they are more appropriately tailored to an extra-regional conflict.

At present the North Koreans have already introduced the most threatening modification to their defense, namely the separating warhead. Even the THAAD, which is ten years away from realization and another ten years from introduction into the Korean theater, might have difficulty intercepting a separated warhead if the warhead has additional penetration aids (penaids). In the most sophisticated application of technology, North Korea may introduce penaids without even buying or producing new missiles.

OBSERVATIONS ABOUT THE TMD ARCHITECTURES

The following are some concluding thoughts:

- The ROK can defend against TM from within its own borders without Japanese or offshore basing.

Because of the nature of the threat and the direction of likely launch corridors, basing theater missiles directly on ROK soil can defend against most theater missile attacks. The lack of a credible cruise missile force in North Korea and the limited inventory of ballistic missiles means that if the ROK defenses apply sound battle management techniques, these forces can operate all of the defense batteries autonomously at any stage of the war.

- TMD requires additional resources in communications, intelligence and launch cueing.

For ballistic missile defenses to work properly and effectively, the defense battery must be cued from overhead launch detection systems, as much warning as possible must be given through the intelligent use of satellite photo and radar imagery, and secure communications must be available to coordinate counterforce operations. Except for launch detection systems which only the United States and Russia possess, all of these capabilities will shortly be available from commercial sources at modest prices.

- Long-term missile threats will require better discrimination techniques and battle management.

Theater missile threats require defenses because of the highly lethal nature of the warheads they carry. But not every theater missile carries a threatening warhead. The ability to discriminate between missile types, warhead types, and intended targets allows the defense to conserve its interceptors' resources, prevent resource depletion, and maintain an efficient defense.

- Counterforce air operations supply an important adjunct to making TMD work effectively.

Theater missile defenses do not act in isolation. Counterforce air operations limit the total number of missiles that can be fired, often slow the pace of the firing, and confine the firing to certain hours of the day when defenses can be better prepared to respond.

**SUGGESTIONS FOR KOREA'S AIR DEFENSE
MODERNIZATION**

Sung-pyo Hong

INTRODUCTION

At the threshold of the new millennium, most countries are keen to build up their air and space power to strengthen their defense capabilities, because military conflicts in modern times usually start with surprise attacks through an air assault. Air power has evolved beyond its role as a supporting arm of surface forces and has matured to achieve many of the capabilities dreamed of by early air power advocates. Although some circumstances might allow its independent use, the true value of air and space power as instruments of national power is their capability to be a leading force, making all of the component forces more effective in a coherent joint campaign. Air and space superiority is a crucial first step in any military operation. It provides freedom from attack, freedom to maneuver and the freedom to attack necessary for success in air, land, sea, or space operations.

Prior to Operation Desert Storm, predictions were made that casualties would be in the tens of thousands and that the war would last more than a year. Neither came true, because the coalition forces fought much of the war with air and space power in a manner that Iraq had not anticipated. Instead of directly confronting and attempting to displace Iraqi troops from their dug-in positions with tanks and troops, coalition forces asymmetrically applied air and

space power to cripple Iraqi air defense systems, their command and control network, and their infrastructure.

In many instances, air and space power have been the most effective tools for defeating the enemy with a minimum loss of lives and resources. As seen in recent conflicts including the Gulf, Bosnia and Kosovo, air and space power played a key role in achieving victory and in compellence operations. Airpower's role in modern warfare has dramatically expanded far beyond the traditional concept of air superiority to newly developed concepts of counter-land and countersea.¹

Air and space power have several attributes that make them a resolute and decisive military instrument for situations requiring military power projection. The first and most important is that they furnish the fastest and most responsive means of projecting power, presence, and influence. Air and space power have been practical tools for compellence of adversary to obey our political will. As seen in Bosnia and Kosovo, if diplomacy and other means have proven inadequate, air and space power provide a highly sophisticated capability to persuade opponents to alter their policy or behavior. For example, one might seek to compel an adversary to stop a military offensive, withdraw military forces, and give up political objectives.

The second important attribute of air and space power is the ability to achieve surprise. Newly developed stealthiness has become more and more important in this sense. In the future, airpower's capability of conducting a surprise attack will become more significantly enhanced with the stealth function in all of the spectrum of conflicts.

The third attribute of air and space power that enhances the military capacity is precision. In conjunction with the ability to reach quickly, achieve surprise, and conduct agile operations, air-launched precision-guided munitions (PGMs) allow immediate strikes against strategic targets of an adversary.

In addition, one of the most widely recognized advantages of air and space power is flexibility. Air and space power can be quickly

¹U.S. Air Force, AFDD1 *Air Force Basic Doctrine*, (1997), pp. 45–46.

diverted from one task to another and from one target to another. Beyond rapid power projection, surprise, and precision, the flexibility of air and space power also enhances military capability to configure the appropriate force package to meet the requirements of diverse missions.

Air and space power are the critical, synergistic enabler for all forms of military power, ranging from other air power projection forces to ground and naval forces. Air and space power are particularly useful for isolating and bypassing an adversary's field troops and strategically paralyzing the enemy's center of gravity.

During the Gulf War, the results of the air campaign were impressive. As known well, Iraq's national command authority was completely paralyzed by the strategic air strikes on the first day. The Iraqi air defense system was completely destroyed by the first two days of air attacks. This made it easy to strike other strategic targets throughout the theater. The coalition's air and space power greatly weakened Iraqi ground forces before the coalition ground offensive began. The Iraqi army was cut off as air and space power destroyed railroad and highway bridges, storage depots, and the movement of supplies to forward-deployed forces. Iraqi troops were completely demolished and demoralized by the terrifying and constant bombardment of the coalition air and space power.

Now, let me briefly review the air and space power doctrinal concepts on air defense.

DOCTRINAL CONCEPTS FOR AIR DEFENSE

Definition of Air and Space Power

First of all, an understanding of the nature of air and space power is necessary. There are two widely used definitions of air power. The first sees air power strictly as a subset of combat power by defining it as "the ability to project military force by or from a platform in the third dimension above the surface of the earth."² It is noteworthy that air power uses the third dimension not merely as a medium for

²M. J. Armitage and R. A. Mason, *Air and Space Power in the Nuclear Age*, London, McMillan, 1983, p. 4.

transit just like a bullet, but for maneuver, deployment, concealment, and surprise.

The second definition comes from William Mitchell. In his writing before space became a consideration, Mitchell described air power as the “capacity to do something in the air. It consists of transporting all sorts of things by aircraft from one place to another.”³ Therefore, it was a capacity derived not just from the war-making components of aviation, but from a nation’s total aviation activity.

These two definitions, in combination, provide a good description of air power: the ability to deliver cargo, people, and war fighting potential through the air to a desired destination to accomplish a desired purpose. In the meantime, space capability is becoming increasingly vital to our national security interests and is directly linked to military operations on land, at sea, and in the air.

We already witnessed space power in the Gulf War. In the Gulf, space-based assets furnished intelligence, navigation, communication, warning, and cueing for coalition military operations. Space is part of the environment in which the military has long operated. Weapon systems such as intercontinental ballistic missiles(ICBM) and theater ballistic missiles(TBM) transit space. Space provides direct situational awareness to ground forces. And space-based sensors are essential for strategic and tactical warning. Under these circumstances, space power is as important as air power for military operations.

Concepts for Air Operations

Let me introduce some newly developed operational concepts for air defense. The new operational concepts based on advanced technologies enable us to create more effective military capabilities.

Leading countries in air and space power, including the United States, the United Kingdom, and Russia, have consistently developed their air and space power doctrine. Evolution of doctrinal concepts

³U.S. Air Force, ‘*Essay I Aerospace Power*,’ in *Basic Aerospace Doctrine of the United States Air Force Vol. II*, 1992.

has been regarded as important as technological innovation of air weapon systems.

The important concepts for air defense are as follows.

(1) Counter-air, Counter-space

Counter-air and counter-space consist of operations to attain and maintain a desired degree of air and space superiority by the destruction or neutralization of enemy air and space power. Although some countries may be able to conduct military operations without air and space superiority, for most countries, air and space superiority is the *sine qua non*. Therefore, dominance of the air and space domain will be essential in future warfare.

The strategic impact of air and space superiority is realized when the degree of superiority allows national leadership to pursue the nation's preferred strategy while simultaneously denying that option to the adversary. Throughout history, the attainment of air superiority has been critical to strategic and operational mobility by all forces. The advantage of military forces that attained air and space superiority is almost incalculable. The results of loss of control over air and space have been well demonstrated in warfare from World War II to the Gulf War in 1991. Contrarily, the absence of air superiority has been keenly felt by twentieth-century ground troops, reliant as they are on maneuver and vulnerable as they can be to interruptions of supply.

(2) Counter-land, Counter-sea

Counter-land operations are those conducted to attain and maintain a desired degree of superiority over surface operations by the destruction or neutralization of enemy surface forces. The main objectives of counter-land operations are to dominate the surface environment and to prevent the opponent from doing the same.

Although normally associated with support to friendly surface forces, counter-land is a flexible term that can encompass identical missions without friendly surface-force presence. This independent or direct attack of adversary surface operations by air and space forces is the essence of asymmetric application and is a key to success during op-

erations to decisively halt an adversary during initial phases of a conflict.

Specific traditional operations associated with air and space counter-land operations are interdiction and close air support (CAS). Interdiction consists of operations to divert, disrupt, delay, or destroy the enemy's surface military potential before it can be used effectively against friendly forces. Interdiction's effect may have a devastating impact on the enemy's plans and ability to respond to the actions of friendly forces. Interdiction usually attacks enemy C2 systems, personnel, materiel, logistics, and their supporting systems to weaken and disrupt the enemy's efforts and may achieve tactical, operational, or strategic objectives.

Close air support consists of air operations against hostile targets in close proximity to friendly forces. These operations require detailed integration of each air mission with the fire and movement of those forces. Close air support provides direct support to help friendly surface forces carry out their assigned tasks.

Counter-sea is an extension of air force operations into the maritime environment. Counter-sea operations are designed to achieve strategic, operational, or tactical level objectives in the pursuit of joint force objectives; the objective is to gain control of the medium and, to the extent possible, dominate operations either in support of naval forces or independently.

(3) Strategic Attack

Strategic attack are those operations intended to directly achieve strategic effects by striking at the enemy's centers of gravity. These operations are designed to achieve their objectives without first having to necessarily engage the adversary's fielded military forces in extended operations at the operational and tactical levels of war. The objectives of strategic attack include producing effects to demoralize the enemy's leadership, military forces, and populations, thus affecting an adversary's capability to continue the conflict.

Strategic attack may also be conducted against fielded forces such as major reserves or politically significant military formations, space launch and support elements, or forces used for strategic nuclear attack. The determining factor of strategic attack is that the strategic

attack should affect the enemy's entire effort rather than just a single action, battle, or campaign. If properly applied, strategic attack is the most efficient means of employing air and space power.

One of the key targets is the enemy's command and control system. Regardless of the nature of the adversary, disrupting the ability to communicate can be a critical step toward achieving strategic paralysis and disunity by cutting off the enemy's political and military leadership from the civilian populace and fielded force.

(4) Counter-information

Counter-information is usually to destroy, degrade, or limit enemy information capabilities for the establishment of information superiority through control of the information realm. The purpose of counter-information is to disable specific enemy information operations and to control the information environment.

Counter-information creates an environment where friendly forces can conduct operations without suffering substantial losses, while simultaneously denying the enemy the ability to conduct their operations. The counter-information includes jamming radars and corrupting data acquisition, transformation, storage, or transmissions of an adversary's information; deception; and cyber attack. It also includes the protection of our information and information systems from the enemy.

(5) Surveillance and Reconnaissance

Surveillance is observing air, space, and surface by visual, aural, electronic, photographic, or other means. Surveillance should provide warning of enemy initiatives and threats and detect changes in an adversary's activities. Space-based surveillance assets are now essential to national defense.

Reconnaissance is observing a specific area for obtaining specific information about the activities and resources of an adversary. Reconnaissance complements surveillance in general, and they are integral to gaining and maintaining information superiority. These operational concepts, mentioned above, have been greatly expanded by the significantly enhanced capabilities of modern air and space power.

Now let me briefly review the newly emerging air defense weapon systems.

NEWLY EMERGING WEAPON SYSTEMS FOR AIR DEFENSE

An air defense weapon system is usually composed of aircraft, missiles, munitions, and air defense radars. In this section, mainly modern fighters and missiles are examined. First of all, let me introduce the manned aircraft.

1. The Manned Aircraft

The manned aircraft provides benefits such as flexibility, wide range of payloads, on-the-spot decisionmaking, and most roles and targets. Downsides include risk to aircrew, heavy logistic demands, and relatively large cost.

Two kinds of fighter aircraft have evolved under the Cold War defense environment. One, still usually referred to as a “fighter,” was maneuverable and cast for the role of air superiority in traditional dog fights with opponents with similar characteristics. The F-16 and the MiG-29 were typical of this genre. Their weapons would be highly agile short-range air-to-air missiles guided by IR sensors, with the AIM-9 Sidewinder, and with air-to-air cannon as back-up.

The second type was the “interceptor.” It was designed primarily to operate at longer ranges against incoming bombers, using radar homing missiles launched “beyond visual range” (BVR). The Soviet MiG-25 and MiG-31 and the British F3 variant of the Tornado were the last examples of fighters which were not designed to “dogfight” with the F-16s and MiG-29s of this world.

However, technological innovations in the last two decades narrowed the gap between the fighter and the interceptor. Maneuverability, acceleration, high rates of turn and climb, all-weather avionics, and weapon systems have become prerequisites for almost all fighters. In particular, stealthy fighters are dominating the airborne, penetrating component of deep strike forces.

The fundamental characteristics of the F-15 and the Su-27 are very similar. Both can carry eight to ten air-to-air missiles over combat radii in excess of 750 miles at heights up to 60,000 feet; both can ac-

celerate up to Mach 2.5; and both can track and engage multiple BVR targets.

The modern fighter aircraft is capable of commanding a huge volume of airspace both through its speed, agility, endurance, and the advanced sensor systems that extend this reach to BVR. It must be able to engage adversaries both close in and at long range and should be equipped with reliable weapons that are optimized for these roles and take full advantage of these capabilities.

The following are examples of the newly developing fourth generation fighters.

(1) The F-22 Raptor

The U.S. Air Force is looking to the stealthy multipurpose F-22. It is designed to establish air superiority in an opponent's airspace without exposing supporting tankers to hostile air defenses. Advanced avionics of the F-22 enable data integration from multiple sensors, long-range detection of enemy, accurate targeting, high reliability, and ease of maintenance. Sensor fusion in the F-22 also provides the pilot a high-speed data correlation, excellent situational awareness, and timely precise tactical action. Information from its integrated sensors include the location of friendly, unknown, and hostile aircraft; threat identification; radar classification, missile launch detection, electronic countermeasures, and external data links.

The F-22 is a stealth aircraft. Thus, it can achieve tactical surprise of enemy aircraft with high survivability. Internal weapons and fuel of the F-22 provide less aerodynamic drag, more maneuverability, better fuel efficiency, and lower radar return.

It is also highly maneuverable with thrust vectoring and super cruise function at a speed of Mach 1.5 at mil-power.⁴ Short field operations and slow-speed maneuverability are significantly enhanced by thrust vectoring.

⁴Unpublished article, Raymond Huot, *F-22*, 1999, p. 2.

(2) The Eurofighter

The agility of the Eurofighter is achieved from an airframe which is inherently aerodynamically unstable. Control is maintained by electrical signals generated by the control column to a computer which relays them to the appropriate control surface. The computer's software supports a quadruple control system designed to withstand two major failures with no operational degradation while still keeping the aircraft safe to fly.

The Eurofighter's radar can search and track multiple targets which are automatically placed in priority by the weapons system computer. All avionics, communications, weapon, and defensive system information is fused onto multifunction displays in the cockpit.

The Eurofighter does not have a stealthy configuration, but incorporates stealthy features, including modified structural materials and engine intake masking. It will deliver a wide range of short and BVR air-to-air missiles.

(3) The Joint Strike Fighter (JSF)

The Joint Strike Fighter program is the most ambitious and important multi-role combat aircraft program in the United States. The JSF program was launched in 1996 and is scheduled to enter service in 2007. Currently seven countries are participating in this program.⁵

The United States intends to produce 3,000 JSFs as a family of stealthy aircraft for the United States and the UK.⁶ The U.S. Air Force gives priority to air-to-ground capabilities, while the U.S. Navy

⁵The JSF international partners are as follows:

The UK: collaborative partner

Denmark, Netherlands, Norway: associate partners

Canada, Italy: informed partner.

⁶Raymond Huot, *Joint Strike Fighter*, presentation in Shepherd air and space power Conference London, 28 January 1999. Details of the orders are as follows:

U.S. Air Force: 1763 conventional take off and landing (CTOL)

U.S. Navy: 480 aircraft carrier capable (CV)

U.S. Marine Corps: 609 short take off and vertical landing (STOVL)

UK Navy: 60 STOVL

specifies a strike fighter. Consequently, three variants were specified: conventional take off and landing, short take off and vertical landing, and aircraft carrier capable.

The JSF will carry two AIM-120C AMRAAMs and two GBU-30 1,000-lb JDAM munitions internally, with four or more external weapon positions, which will dramatically reduce stealth characteristics. The JSF will be equipped with a long range precision radar, electronic countermeasures, and advanced processing capacity. It will depend on external sources for target and threat information.

In addition to these fighters, there are some more new fighters such as the Su-35, Gripen, and Rafael. Details about these, however, are omitted here.

(4) The B-2 Bomber

The B-2 is one of the most distinctive products of the modern technological revolution. It is the best example of the virtually self-contained, comprehensively equipped combat aircraft. Like the fighter, it is designed structurally to reduce IR, electro-optical, acoustic, and radar signatures to a minimum. It has an unrefueled intercontinental range of 6,900 miles with a bomb load of 32,000 lb.⁷

The B-2's fully automated mission planning system may be programmed before departure from home base. It can deliver a wide variety of free-fall and guided bombs, submunitions, missiles, and nuclear weapons, including a GPS-guided bomb with a deep penetration warhead for use against bunkers and underground installations.

For making a deep strike package with non-stealthy aircraft, it requires a considerable amount of extra forces to provide air-to-air, ECM, and SEAD protection. Considering this, the B-2 is a cost effective weapon system.

2. Unmanned Aerial Vehicles (UAVs)

UAVs provide a range of benefits, such as no risk to aircrew, lower cost, flexible basing, and no human-factor limits. Downsides include

⁷*Janes Aircraft*, 1998.

operational restrictions, vulnerability to countermeasures, flight safety, mobile target limits, software risks, and autonomous operations.

The potential of the UAV to replace manned aircraft is very high. In air-to-air combat, where awareness, responsiveness, reach, speed, and agility are likely to be determining factors, the removal of the pilot from the cockpit offers great advantages. It also reduces casualty risk and political sensitivity.

Offensive use of UAVs, however, may require automated self protection systems to compensate for lack of on-board situational awareness. Current development of miniaturized munitions will further benefit a smaller UAV structure. It will reduce airframe radar cross section (RCS), greatly increase acceleration limits, permit omnidirectional acceleration and the execution of high G maneuvers to present minimum RCS to a threat and to evade missiles. Low-observable UAVs can loiter for many hours outside detection range carrying GPS-guided munitions and make a formidable contribution to the initial establishment of air superiority for exploitation by manned aircraft.

Stealthy unmanned aerial vehicles will play an increasing role in strategic reconnaissance and should dominate airborne reconnaissance at all ranges. The advent of UAV-based air operations can also form the backbone of a communication network, particularly if used in conjunction with space systems. Stealthy, weaponized, loitering unmanned aerial vehicles can come to dominate much of the close-strike mission, too. However, the comprehensive replacement of manned combat aircraft by UAV remains many design, development and experimental years away.

3. Missiles

Semi-active missiles such as Sparrow and Skyflash were the first to exploit the BVR capability that radar provided. They had significant drawbacks, however, not the least of which was that the shooter had to continually illuminate the target throughout the engagement.

The advantages of an active missile, one with its own radar sensor were clear; however, the realization of this concept required a significant leap in technology. The success of modern-day active missiles is

largely due to the revolution that has been made in electronic components and packaging. By its very nature, air combat is a highly dynamic field of endeavor and is driven by a continual effort to maintain a clear lead over potential adversaries.

(1) Air-to-Air Missiles

Air-to-air missiles have increased their sensitivity to targets, improved their agility, increased their speed, and extended their range. The lethality, speed, and range of air-to-air missiles have driven the need for integral early warning and passive defense equipment.

Despite extended warning and detection ranges, a large number of air-to-air encounters still culminate in close combat. A new AIM-9X is reportedly known as harmonized with helmet-mounted sights, with an acquisition field of more than 180 degrees, thrust vector control, cryogenic cooler to increase IR seeker sensitivity, IR countermeasures and other improvements designed to regain superiority over competitors such as the Russian Vympel R-73. For its part, the Vympel R-73 is reported to have passive IR seeker and laser or radar proximity fuzes, with a sensor field of 140–180 degrees against a target maneuvering at up to 12G as far as 18 miles away.

In modern air combat environment, information advantage based on superior detection and engagement range becomes critical. At present, the U.S.-developed AIM-120, one of the most effective BVR Air-to-Air Missiles (BVRAAMs), has an effective range of about 30 miles, but its associated radar can “see” for more than 50 miles, and AWACS can detect and identify about 200 miles. Therefore, there is a strong demand for closing the gap between detection range and BVR missile lethality.

Guided air-launched munitions have been used effectively since the Vietnam War, but their proportional contribution has rapidly increased in the last decade. The guided air-launched munitions have allowed air attacks to be made discriminatory at a time when civilian casualties and collateral damage can be self-defeating.

(2) Surface-to-Air Missiles (SAMs)

During the Gulf War, coalition air forces were reported to have been threatened by 11,000 SAMs and 8,500 air-to-air guns. Although they

were demolished within 48 hours, the coalition air operations were restricted to heights above 10,000 feet by the residue of low level SAMs and guns. Since then, SAMs have also benefitted from the microprocessor to increase their responsiveness, range, sensitivity and lethality. The U.S. Stinger, Soviet SA-7, 14, 16 and 18, and French Mistral were the similar family in air defense weapons.

The Patriot already demonstrated its capability in the Gulf War. Although its success rate for missile interception is quite low, the Patriot is the only means available for missile defense in the Western bloc. The Russian-made missile encounter S-300V was marketed in 1997. The S-300V can intercept six targets up to 150 km in range and from 10,000 to 25,000 meters in altitude. Patriot derivatives and S-300V represent continued efforts to provide a more effective antiballistic missile defense.

In sum, the SAM has the following traditional shortcomings. Short-range systems can be outdistanced by stand-off weapons launched beyond the SAM's operating range. Fast, low-flying aircraft, especially equipped with automated warning and chaff dispensers, are still difficult to intercept. Medium- and longer-range SAMs are susceptible to low-level penetration.

(3) Ballistic Missiles

Since World War II, ballistic missiles have been employed in the 1973 Arab-Israel War, the 1980–1988 Iran-Iraq War, the 1991 Gulf War, the Afghan civil war, and the recent conflicts in Bosnia and Kosovo. According to recent press reports, some 50 countries deployed 40 different types of ballistic missiles during this period. Many were SCUD derivatives with ranges of less than 740 km. North Korea, Iraq, and Iran have extended the missiles' range to an estimated 2,000 km with a payload of 770 kg.

Ballistic missiles' CEPs are usually assumed to be several hundreds of yards. When delivering a conventional unitary explosive warhead against a specific military target, these are unreliable compared to modern PGMs.

In the Gulf War, however, Iraqi SCUDs proved to be a formidable weapon in political and strategic terms. For example, although the SCUD attacks did not cause any militarily significant damage, they

threatened to bring Israel into the war, diverted substantial airlift resources, and caused a large number of allied sorties to be diverted into fairly unsuccessful SCUD-hunting missions.⁸ Moreover, there is growing evidence since the conflict of the Patriot's limited effectiveness and the inability of offensive strikes to destroy Iraq's missiles and weapons of mass destruction. This highlighted the vulnerability of U.S. and allied forces to attack throughout the war. The SCUD experience has naturally heightened concern about the proliferation of these weapons.

(4) Cruise Missiles

Cruise missiles are usually defined as stand-off weapons capable of mid-flight and terminal guidance with a range in excess of 50 km. It is reported that approximately 130 types of cruise missiles are deployed by 90 countries.

In the wake of World War II, the U.S. Air Force and Navy maintained an ongoing flirtation with the cruise missile during the 1950s. But neither service displayed any strong and consistent interest in cruise missiles for land-attack operations. Improvements in propulsion and guidance technology resulted in U.S. development of far more accurate land-attack cruise missiles in the late 1960s and the fielding of the nuclear-tipped Air Launched Cruise Missile and a ground-launched derivative in the 1970s and 1980s. However, only the U.S. Navy pressed ahead publicly with a conventional variant of its Tomahawk Land Attack Missile. The Tomahawk and air-launched cruise missiles well demonstrated their supreme capabilities in range and accuracy in the 1991 Gulf War. Meanwhile, shorter-range missiles also significantly increased their accuracy with the GPS component.

SUGGESTIONS FOR KOREA'S AIR DEFENSE MODERNIZATION

The Korean Air Force should be equipped with these superior weapon systems for strengthening its defense capability in the new millennium era. These weapon systems, however, require a huge

⁸Christopher J. Bowie, *Trends in the Global Balance of Airpower*, RAND, 1995, p. 69.

cost in acquisition, and Korea is currently suffering economic hardship. In retrospect, strengthening the national security has required an enormous effort including human lives, resources, and endeavors. Thus, the Korean Air Force requires a technologically specialized approach to the acquisition of these advanced systems.

At the same time, due to declining resources in the defense sector, Korea should fundamentally reexamine its defense structure including force structure, budget allocation, and management system from a zero base for enhancing its defense capability. In a long-term view, Korea is required to modernize its force structure with the models of advanced countries such as the United States, the United Kingdom, and probably Japan.

Although many specialists argue that South Korea's air power is inferior to that of the North, South Korea actually has a strong air power compared to its size of national power.⁹ The ROK Air Force has been keen in training its manpower, in improving equipment and facilities, and in developing doctrine for effective operations. However, future air threats will be more and more sophisticated and consequently harder to respond to.

Five measures are essential for Korea's air defense modernization at the threshold of the 21st century. They are quality warriors, advanced weapon systems, sanctuary bases, doctrine evolution, and continuing revolution in military affairs.

1. Quality Warriors

Force in combat normally is provided by weapons of some type, backed by sophisticated technology that locates the enemy during day or night in any kind of weather and delivers both guided and unguided munitions with great precision. These weapons combine with technologically advanced systems that facilitate command and control, protect fighting forces, and sustain their operations throughout the course of conflict. Yet, as General George Patton, Jr. emphasized,

⁹According to a RAND research report, South Korea was ranked as the 15th top air power of the world in 1991. For more details, see Christopher J. Bowie, Kirninder Braich, Lory Arghavan, Marcy Agmon, Mary Morris, *Trends in the Global Balance of Air Power*, RAND, 1995, p. 57.

"Wars may be fought with weapons but they are won by men."¹⁰ In this sense, quality warriors are the first requirement for the ROK Air Force to successfully accomplish its roles and missions for national defense.

Airmen—well prepared and led by competent and caring leaders—will remain key to success in future military operations. The judgment, creativity, and fortitude of our air force people are essential to comprehending and executing future engagements.

In the new millennium era, these warriors will face a wide variety of challenges across the range of military operations. We must seek ways to empower them in order to fully use their potential for national security. One way is by enhancing training and education to cope with the rigors of the high-technology combat environment. Future warriors must be able to make rapid, doctrinally sound decisions as they plan and execute missions in diverse, high-pressure environments. Therefore, future warriors should also be physically fit and healthy, psychologically sound, and ethically disciplined. In this regard, the ROK Air Force should put its resources primarily into educating and training its people to turn them into warriors.

2. Advanced Weapon Systems

The ROK Air Force should be equipped with advanced weapon systems by upgrading or acquiring newly developing weapon systems. This is the second requirement.

Modernization of air defense systems has always been critical to consolidating national security. Modernization programs of air assets should be made in a balanced investment of fighters and missiles, of stand-off and direct munitions, and in the evolving C⁴ISR architecture required to integrate these assets in a comprehensive precision strike regime. Linked with information technologies, the combination will allow killing any target that can be identified.

Strategically, Korea should put its resources into a specific technological area rather than try to develop the whole aerospace industry. The aerospace industry is simply too big to be developed by

¹⁰U.S. Joint Chief of Staff, *Concept for Future Joint Operations*, (1997), p. 17.

Korea, a developing middle power. For the same reason, most European countries are developing the Eurofighter in a consortium project, because it is the safe, low-risk way.

In the new millennium, fourth generation fighters, including F-22, Joint Strike Fighter, Eurofighter, Rafael, and Su-35, together with precision guided munitions, will be major tools in air warfare. In particular, stealth, combined with stand-off capability, will contribute greatly to the protection of manned systems on the modern battlefield and will also be used extensively for other high-value, unmanned systems. Despite the current economic hardship, therefore, Korea should put its defense resources into the enhancement of air and space capability for consolidating its national security.

3. Sanctuary Base

As emphasized in most air and space power doctrines, sanctuary bases are becoming increasingly important because full dimensional protection of air bases is essential for war victory. The defense of air bases must encompass both aerial threats and ground attacks.

The problems of air defense through the use of anti-aircraft systems are relatively well understood, but ground defense poses a more complex set of problems, particularly for air bases. Aircraft are most vulnerable when they are on the ground, and personnel are equally difficult to protect. Such targeting could be geared to the destruction of expensive aircraft on the ground or key personnel, so base security on an unprecedented scale may be a necessity. As a high-value target, the fixed base is the air and space power's center of gravity.

In this regard, air bases should be located at strategic points for strengthening national defense. Aircraft, lacking strategic range and the freedom to operate from bases within a strategic sanctuary, will be forced to operate from dispersed, unimproved, transitory airfields during periods of limited visibility and with the active support of information warfare deception operations. Since survivability of the air bases is crucial for national defense, they should be fully protected against all kinds of attack.

Bases should also provide warriors all the conveniences for their continued missions and for a quality life. In particular, welfare status

in military bases will be one of the most important factors for the young generation's job preference in the future. Therefore, good welfare status is essential for obtaining quality warriors.

4. Doctrine Evolution

Evolution of airpower doctrine is also an important factor in modernizing Korea's air defense. Doctrine provides a military organization with a common philosophy, a common language, a common purpose, a unity of effort, and the best way of "how to fight or how to employ military forces." It gives warriors the basic principles in military affairs and operational concepts in joint warfare. It also gives clear guidelines for the successful accomplishment of the missions.

Doctrine is firmly linked to professional military education and training. At its best, doctrine is like an observation tower from which to survey past lessons, current practices, and future concepts for military operations.

As Dr. Rebecca Grant stressed in her briefings to the U.S. military leadership in 1996–1997, evolution of war fighting concepts is no less important than any improvement of weapon systems.¹¹ General Ronald Fogleman, former Chief of Staff of the U.S. Air Force, emphasized that the ultimate goal of the airpower doctrine should be the development of an airman's perspective on joint warfare and national security issues.¹² This is valuable advice for our doctrine evolution.

It is also important that a service's doctrine maintain its own characteristic features at the juncture with joint or other services' doctrine. Regarding this, Dr. Grant said, "The danger is that, as joint doctrine and visions gain strength, the services may find it hard to carry out their missions if they are not allowed to develop new doctrine and capabilities outside of the joint framework—a framework that hinges primarily on surface maneuver."¹³

¹¹Rebecca Grant, "Closing the Doctrine Gap," *Air Force Magazine*, January 1997.

¹²*Ibid.*

¹³*Ibid.*

The Korean Air Force should develop concepts on air campaign plans under the direction of the Joint Forces Air Component Commander (JFACC) as a joint warfighting concept. The importance of JFACC's role in modern warfare was proved in the 1991 Gulf War, and the JFACC concept has been widely adopted by the United States, NATO, and the UK. Thus, it is imperative for the Korean Air Force to develop a new campaign model under the leadership of JFACC.

In a long-term view, the Korean Air Force also needs to integrate doctrine organizations under a single commander and to update doctrine publications, especially its operational-level doctrines. A single commander—with authority over every major doctrine function in the field—will strengthen the Air Force's doctrine organization significantly by providing direct oversight of all major doctrine functions. An independent structure can also keep the Korean Air Force up to speed with fast-moving changes in the world of joint doctrine.

5. Revolution in Military Affairs

The final requirement has to do with the revolution in military affairs (RMA). The genesis of the RMA is the hypothesis advanced by Marshal of the Soviet Union Nikolai Ogarkov that the new generation of precision weapons, coupled with new sensor and information architectures, created a reconnaissance-strike complex capable of generating discontinuous change in warfare, a revolution in military affairs.¹⁴

During the Cold War period, the military technological revolution (MTR) enormously contributed to enhancing combat capability. However, in recent years, most countries are keen to achieve RMA, which is an extended concept of MTR with the revolutionary evolution of operational concepts and cost effective management. We can keep up an effective combat readiness at a reasonably low cost by continuing RMA.

RMA represents a substantial change in the means and methods of warfare, similar to that associated with the advent of gunpowder, the

¹⁴"The Future of Warfare," *The Economist*, 8 March 1997, p. 21.

tank, the airplane, and nuclear weapons. Proponents of modern RMA generally point to a set of technologies that can substitute for existing military systems with greater effectiveness and lower costs as evidence of the revolution. In the military sphere, stealth, precision guidance, directed energy, and digitized multi-source information are all cited as examples of an emerging revolution.

Concerning RMA, three major ideas are emerging on how combat environment will be changed. First, long-range precision weapons, coupled with C⁴ISR, will alter warfighting concepts. Long-range precision engagement can play an increasingly prominent role in power projection at all levels across the range of military operations.

Second is the emergence of information technologies. Information technologies have dramatically improved our ability to gather, process, store, and disseminate information in real time.

Third is the increased use and application of space systems. This exploitation is impacting all aspects of military operations, enhancing information systems and relevant information capabilities, dominant battlespace awareness, and C² capabilities.

The potential emergence of space as a warfare zone is altering its military importance. The ability to locate and destroy, with a high degree of confidence, high-value fixed and mobile targets on earth and in space may fundamentally change how we think about and conduct war. These same capabilities could also impact other present-day military tasks such as peacekeeping and humanitarian assistance operations.

Through continuing RMA, the ROK Air Force should leverage present and emerging technologies to provide the best possible equipment, doctrine, training, and support for the military.

Conclusion

Airpower's role in modern warfare expanded beyond air superiority to command of the land and sea through the development of precision guided munitions. Consequently, many countries—including those in the Asia-Pacific region—are keen to enhance their air capability.

Korea's air defense capability is currently very weak, making U.S. support in case of war absolutely essential. Therefore, the ROK should gradually strengthen its air and space power to effectively achieve its national defense goals.

The future defense environment forces us to build up a strong air and space power for consolidating national security. Power projection in national defense and conflict resolution is airpower's primary responsibility. Air and space power offer the national command authority flexibility for executing military operations in the theater.

A few years ago we witnessed in Iraq the fate of a country that lacked air and space capability. Unable to fly over coalition forces, Iraq lay blind to the air and ground offensives gathering against it, while the coalition air and space power exposed Iraq's plights and demolished them completely. As also demonstrated in many recent conflicts including Kosovo, Bosnia, and Chechenya, air and space power played a key role in obtaining victory.

In conclusion, despite its current economic hardship, Korea should not neglect enhancing its air and space capability for national defense. While the economic crisis will be fully overcome in the future, such neglect could irreparably damage Korea's national security. For, as the history of modern war teaches, air power cannot be built up in a day.

**CURRENT STATUS AND EMERGING TRENDS IN
KOREAN AEROSPACE POWER STRATEGIES**

Myong-Sang Choe

INTRODUCTION

As the 21st century looms on the horizon, mankind is witnessing powerful changes in both the characteristics and patterns of warfare. As a result, the very fundamentals of warfare are no longer the same. Until World War II, virtually all wars took the shape of positional warfare, prolonged warfare, or wars of attrition.¹ Their similarities lay in their characteristics of absoluteness. As Clausewitz so aptly put it, "War is an act of force to compel our enemy to do our will."² According to this point of view, victory can be the only objective of any war. This type of warfare involving the direct confrontation of ground forces inevitably led to heavy human and economic losses on both sides.

The Industrial Revolution brought about innovations in scientific technology, introducing flying machines to the battlefield and moving wars into three dimensions. In the early 20th century, pioneers of air power theory, such classical air theorists as Italy's Giulio Douhet,³ Britain's Hugh Trenchard,⁴ America's William

¹Karl P. Magyer and Constantine P. Danopoulos, *Prolonged War* (Air University Press, 1994) p. 15.

²Carl von Clausewitz, *On War* (Princeton University Press, 1976) p. 75.

³Douhet was the first to write a comprehensive theory of air power; his book, *The Command of the Air*, published in 1921, addressed air warfare in terms theoretically

Mitchell,⁵ and the Russian-born American Alexander de Seversky⁶ predicted that, "In the future, air superiority would decide the outcome of war." Farsighted as they were, these innovators faced great difficulty in obtaining public support for their views.

The concept of strategic bombing, emphasized by the early theorists, overlooked the limitations of these early weapons systems and the development of anti-aircraft weapons. Doubts emerged regarding whether air power could achieve its objectives. Even after the U.S. Air Force 8th Bomber Squadron's successful strategic bombing of the German Schweinfurt ball-bearing factory in the fall of 1943 during World War II, an event which led to the development of independent air forces in most of the advanced nations, the concept of strategic bombardment continued to struggle with its past limitations. Hence, when it was employed again with lackluster results during the Korean and the Vietnam wars, there was no silencing its critics.

Fortunately, in the Gulf War air power fundamentally broke with its past. Air Vice Marshal Tony Mason, RAF (ret.) wrote, "the Gulf War marked the apotheosis of twentieth-century air power."⁷ Air power, employed strategically, proved that the attainment of air superiority could, indeed, decide the outcome of war. Furthermore, the manner in which the power was deployed showed that by simultaneously destroying several targets through selective destruction methods, victory could be achieved in a much shorter period of time and with far less sacrifice than could ever be gained through the use of mass destruction.⁸ Throughout the Gulf War, air power also demonstrated that it was no longer an extension of fire power for ground and naval forces, but was, instead, a mature capability that could itself directly achieve the national objective. During the Gulf War, air power finally

applicable to any industrialized state. "To conquer command of the air means victory..."

⁴Andrew Boyle, *Trenchard* (London, 1962).

⁵Alfred F. Hurley, *Billy Mitchell: Crusader for Air Power* (New York, 1964).

⁶Alexander de Seversky, *Victory Through Air Power* (Garden City Publishing Company, New York, 1943).

⁷R. A. Mason, "The Air War in the Gulf," *Survival* 33, No. 3 (May-June 1991) p. 211.

⁸General Colin Powell (former Chairman of the Joint Chiefs of Staff), "Defense Appropriation Testimony of the Air Power played in the Gulf War." Senate Armed Service Committee (February 21, 1991).

lived up to the expectations of those beleaguered early pioneers of air power theory.

In order to profit from the recent validation of such air doctrines, the Korean Air Force must continue to develop in the area of early warning systems, intelligence warfare, stealth aircraft, and overall accuracy. Furthermore, there must be consensus among military services that air power will take the initiative in future warfare. In this regard, the efforts of the Korean Air Force to construct a "Strategic Air Force," by initiating appropriate methods and providing direction for the Republic of Korea Air Force in future conflicts on the Korean peninsula, are a laudable and effective course of action in accordance with the changed war pattern.

As part of that effort, this chapter considers the current status and emerging trends in Korean aerospace power strategies. It aims to forecast the shape of future warfare, and to help bring about changes in the understanding of the uses of air power. At the same time, it will analyze security threat factors, taking into consideration that Korea is surrounded by regional superpowers and that North Korea has demonstrated a consistent pattern of invading South Korea. Finally, this chapter seeks to address the future direction of aerospace power strategies and the construction of military power in Korea for purposes of national security and unification. Discussion focuses on strategic objectives and how they are achieved; this chapter does not address the aerospace industry or resources that deal with issues such as the distribution of the national defense budget or military organization.

The reason the term "aerospace power" is used instead of "air power" is to emphasize the need for the orchestration of all resources utilizing three-dimensional space. These include the Air Force, Army, and Navy aerospace power systems, as well as civilian aviation and military satellites, which will be active components in the future. I would like to note that this chapter does not represent official policy or strategy of the Korean Air Force; it is an individual opinion prepared for scholarly presentation. As a former frontline fighter pilot and retired general, I feel that it is my duty and responsibility to improve Korean military strategy for our national security.

FUTURE WARFARE AND AEROSPACE POWER

Changes in War Pattern

War, defined as a “collision between two opposing wills and organized forces,”⁹ requires the employment of one of two military strategies. The first possible employment is to destroy the enemy’s organized forces such that they must surrender their will. The second is to paralyze the enemy’s will and so destroy its ability to take effective action.

Wars prior to World War II generally took the shape of the former wherein destroying the enemy’s ability to wage war was considered the only way to fight. Even if the strategists of the past could have conceived of directly challenging the enemy’s will, they had no substantial method by which to do so. As the French Revolution and the Napoleonic War introduced the concept of a “peoples war: national war”¹⁰ and the industrial revolution brought new developments to the waging of war, war patterns started to take the shape of two massive forces colliding in a fierce battle zone. If one side did not possess superior strategy or military operations, then the eventual result was positional warfare, prolonged war, or a war of attrition.

During World War II, the concept of “blitzkrieg” was introduced. Its fast maneuvers enabled the enemy’s strong points to be avoided. Furthermore, by penetrating his weak points, one could attack the enemy deep within his territory and, subsequently, bring confusion and massive destruction to his military power. These strategies were attempts to bring an early termination to the war. They departed from previous warfare where military strategy had been aimed at destroying the enemy’s military force and not at attacking his will to fight.

After two world wars revealed that technology had advanced to the point of permitting unlimited destruction, war patterns began to change. After World War II, military strategists adopted the method

⁹Carl von Clausewitz, *On War* (Princeton University Press, 1976) p. 75.

¹⁰Edward M. Earle, “Frederick the Great, Guibert, Bulow: From Dynamic to National War” *Makers of Modern Strategy: Military Thought from Machiavelli to Hitler* (Princeton University Press, 1947) p. 74.

of suppressing the enemy's resistance by paralyzing his will to fight. Again, the concept was a departure from past warfare where fighting by two well-trained and heavily armed forces not only consumed excessive time and resources but brought heavy casualties and high insecurity, not only to the fighting parties, but to the rest of the world as well.

Wars have always begun because one of the parties involved believes that there is some benefit to be gained through the means of war. Today, wars for the sake of war, wars to appease emotions, such as a war of revenge bent on total annihilation of one's enemy, are no longer permitted. As the world becomes more aware of the interconnectedness of nations and peoples, such wars are no longer tolerated by the global community. There is sound reason for this lack of tolerance.

Modern science and technology have increased the destructive ability and the precision of weaponry to an alarming level. The spread of war technologies has led to a worldwide proliferation of weapons of mass destruction. Paradoxically, if one nation or group should attempt to force its will upon another in an attempt to gain something through war, that group or nation would likely have to resort to the kind of destruction of its enemy that would also destroy the benefits (e.g., land, resources, etc.) that it sought to attain in the first place. Moreover, wars of that nature can escalate to a level of such massive destruction to both sides, to surrounding populations and beyond, that they can no longer be endured.

In other words, mankind has at last reached a level of wisdom where no emotional reason for war can be acceptable, and no war can be permitted to continue to the point of total annihilation of an enemy. Such a war destroys vanquished and victor alike. However, war remains pragmatic. Should the international community deem that a particular war is necessary, will that pragmatism still prevail? By the same token, should a measure be known that will end the war with the least amount of casualties on either side, that measure must be taken.

The humanitarianism which came to the fore after World War II has greatly influenced the strategies of war. Military strategists now consider costs in terms of human life rather than in material terms. In

other words, it is better to spend more money on sophisticated weaponry than to sacrifice many human lives. Past methods of mass destruction are eschewed in favor of more indirect approaches. Maneuverability has become a key factor in fighting methods.¹¹ Primary strategic attack patterns now include attacking enemy troops before they set their position at the front line, while they are in the midst of mobilization, or causing shock, confusion and paralysis by seeking them out for attack deep within their own territory.

Future military deployments will be very limited in comparison to those in the past. Where once victory was proclaimed through territorial conquest and the destruction of the enemy forces, today it is defined through showing one's will to fight while, at the same time, suppressing the enemy's will. I believe that in wars of the future, victory will be achieved not by direct confrontation, but by identifying the extent of the enemy's will and then conducting a precision attack on the enemy's strategic center of gravity.

Because of scientific advances, a typical representation of future warfare will involve the employment of a limited military force that has the capacity to inflict a high level of indirect damage at the enemy's strategic center of gravity. Situational battles commensurate with the changes in the strategic environment will be the general pattern of war. Political victories will be achieved through intense battles of relatively short duration, thus minimizing unnecessary expansion. This more advanced form of war, and the transition in war patterns themselves, will meet the demands of the international strategic environment.

Changes in Aerospace Power Awareness

Since the new concept of fighting in the air or "victory through air power"¹² was introduced into two-dimensional ground and sea war, the contours of war have changed dramatically. Still, not everyone is convinced that air power will lead the way in future wars.

¹¹Liddell Hart, *Strategy: The Indirect Approach* (Praeger, New York 1954), Andre Beaufre, *Introduction a la Strategie* (Librairie Armand Colin, Paris 1965)

¹²Alexander de Seversky, *Victory Through Air Power* (Garden City Publishing Company, New York, 1943).

These lingering doubts about air power stem from two major criticisms. The first concerns a lack of sustainability as compared to ground and naval forces. Airplanes must land in order to refuel, rearm and exchange flight members and therefore, they can not control the battlefield for a long period of time. The second criticism centers on the fact that air missions are limited in bad weather conditions and at night. Thus, it is argued that because air power can not seize or conquer ground or marine territory, it can not perform the same role as ground or naval forces. Then, there is the cost-effectiveness issue. Generally, the cost of possessing air power is tremendous and, for this reason, it is argued that it is better to use other less-costly measures. However, it is unfair to conclude that air power is not useful or effective simply because of its inability to control every battlefield detail. As this chapter will demonstrate, air power is too forceful a battle element to ignore.

In truth, warfare requires diverse strategies and diverse weapons. Although a specific force may dominate a war, it is very rare that it assumes sole responsibility for the tactics of the whole war. Elements such as the characteristics of the enemy, the war itself, and the cost that the population must bear, decide the kind of military tool, and in what ratio it must be applied as the mode of warfare. Looking at it from this perspective, a nation's dependence upon air power is enormous. Air power, which has one of the best surprise-attack abilities and maneuverability among all military strategies, can be relied upon as the major strategy in a war or a conflict. Indeed, that is the case, especially with recent technological developments, for we are now seeing more and more political and strategic needs met by air power.

Dr. Edward N. Luttwak of the Center for Strategic and International Studies in the United States made the following remarks regarding past perceptions of modern air power's ability to achieve political and strategic objectives: ". . . seventy years of overpromising by air power advocates had left a deep residue of distrust in Washington's military culture because air power was thought to have failed in Indochina in some very general sense and because it was not

deemed to have been 'decisive' in either the Korean War or the Second World War. . ."13

That perception persisted right up until the war against Iraq. Many people were convinced that air power in that endeavor would also be "indecisive" while others predicted outright failure. Those who held those views did not foresee the profound impact that air power had in Iraq and more recently, in Kosovo. During the Iraq war in January 1991, aircraft such as the F-15Es, F-111s, and F-117s fighters dropped laser-guided bombs within three feet of their intended targets. The whole world watched the actual filming of the attack sequences on TV, electronically witnessing the devastating impact of the bombings. Today air power has revived belief in the capabilities of air power that General Giulio Douhet, General Billy Mitchell, Air Marshal Hugh Trenchard, and the other theorists of the 1920s assumed. The bold assertion, "To have command of the air is to have victory" was finally borne out in the Iraq air war. The 1991 Gulf War, which took place exactly eighty years after the first employment of air power by the Italians during the North African War in 1911, marks a turning point in our perceptions of air power.

The Future Roles of Aerospace Power

War is an extension of politics, and the objective of military operations is to achieve political goals. The political objective of a war ranges from securing the unconditional surrender of the enemy to making the enemy accept a cease-fire under favorable conditions. No matter what the objective, however, it is safe to say that the formation of a political objective emanates from leadership decisions by the adversary. In other words, a nation decides what kind of concession must be gained based on its enemy's actions. Clearly, if the enemy's command structure is of the utmost importance, then in every war activity the enemy's leadership, as the enemy's center of gravity, should be considered the designated target.

¹³Edward Luttwak, "Air Power in U.S. Military Strategy," *The Future of Air Power in the Aftermath of the Gulf War*, edited by Richard H. Schulz, Jr. and Robert L. Pfaltzgraff, Jr., (Air University Press, 1992), pp. 20-22.

However, it is not always prudent to directly attack an enemy's command structure. The reason is quite simple. If I know that the enemy's command structure is important, then so does the enemy, and he will protect it with heavy defensive structures. If it is to be attacked, the attack must be successful. If success cannot be assured, then it is more prudent not to attack. This is precisely why destroying the will of the enemy leadership was not considered a military objective in earlier warfare. There simply were not the appropriate means to overcome the enemy defense line and penetrate the leadership command structure.

But that is not the case now. Today, we have the means. Most definitely, air power has closed the gap between strategies and tactics and brought changes in every dimension. John A. Warden III, professor of the USAF Command and Staff College who planned the air campaigns for the Gulf War, says, "Air power's role in strategic warfare is to bring strategic paralysis so that the enemy can't physically respond to it. Whether it will be direct or indirect, all efforts should be aimed at the enemy's strategic center."¹⁴ As seen in the Gulf War, air power has matured to the ideal level of capability that the air power pioneers once dreamt of.

Air power can now play its role as the most effective method of attacking the enemy's center of gravity, and this air power, which has developed so much in recent years, will dominate the warfare of the 21st century. Aerospace power of the future, as an ideologist of air power once said, will become a core force that will execute a new way of warfare, and become the definitive concept of the term, decisive war. In the past, air power was employed in order to support the mobilization of ground forces. In the future, the opposite will occur: ground and naval forces will mobilize in order to support air offensive operations. Just as territorial conquest, which was the main issue in past two-dimensional wars, has lost its importance in the three-dimensional war, so too, the tactics that were once conducted as serial strategies have given way to air campaigns in which multiple air operations occur simultaneously.

¹⁴John Warden, "The Enemy as a System," *Airpower Journal*, Spring 1995, pp. 43-44.

As we witnessed during the Gulf War in which all air operations were conducted in parallel, aerospace power now makes possible the "attack that can be done simultaneously anywhere" just as Clausewitz foresaw that it would. Parallel warfare has overcome the limitations of the serial warfare we knew in the past. It can now strategically paralyze the enemy to bring a fast conclusion to a war. This will be aerospace power's major role in future warfare.¹⁵

The Gulf War may well be remembered as the war that helped the United States overcome the failures of the Vietnam War and achieve a brilliant military victory. "The Persian Gulf War was the first major conflict after the end of the Cold War. The victory was a triumph of coalition strategy, of international cooperation, of technology, and of people. It reflected leadership, patience, and courage at the highest levels and in the field."¹⁶ What are the lessons of the Gulf War? There are some who argue that it was a fight between an adult and a child and that a U.S. victory was inevitable. Others contend that because the Gulf War was a desert war, it contained the geographic conditions that most effectively showcase the value of air power. It is also argued that one can not expect the same performance in another sort of environment, such as on the Korean peninsula, where the two sides have relatively similar forces and a shared, mountainous terrain. While these arguments are certainly not without merit, when analyzing the Gulf War, we would do better to focus on more fundamental questions.

During the Gulf War (January 17–February 28, 1991), it is generally acknowledged that the United States conducted most of its offense through the use of air power. When the war was over, there were only 100 hours of ground forces operations. Air power, which dominated most aspects of the war, attacked extensive targets in the early stages. It also conducted selective and systematic precision surgical attacks on Iraqi command, control, communication systems, SCUD missile sites, and chemical and air defense targets. Having lost its command

¹⁵Professor Meilinger of the School of Advanced Airpower Studies also describe some of airpower's unique characteristics such as "Airpower can simultaneously conduct parallel operations at all levels of war." Phillip S. Meilinger, "Ten Propositions Regarding Airpower," *Airpower Journal*, Spring 1996, pp. 52–53.

¹⁶Dick Cheney, "Overview: The Conduct of the Persian Gulf War," *Conduct of the Persian Gulf War* (Department of Defense, April 1992) p. 159.

centers and its nerve system, Iraq became strategically disabled. The United States then focused its air power on the Iraqi supply line and executed compounding damage.

By the time ground operations started, air power had already destroyed the Iraqi force response ability. The multinational force destroyed three times more targets during the 40 days of the Gulf War than the U.S. 8th Air Force did during the whole year in 1943 when World War II's strategic bombing was at its height.

For this reason, the Gulf War will be remembered as the war in which air power forever ceased being the support of ground and naval operations and came into its own as an independent firepower that directly aims at achieving the war objective with the support of ground and naval forces. In fact, the Gulf War demonstrated that the systematic operations of air power, using high technology such as satellites, airborne warning control systems (AWACS), electronic warfare aircraft, joint surveillance target attack radar systems (J-STARS), advanced fighter planes, and strong and precise destructive weapons, can destroy almost any enemy target without the support of ground forces.

The Gulf War is likely to be the beginning of futuristic warfare which will be conducted in a new pattern with new methods. We have learned from the Gulf War the lesson that "Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes occur."¹⁷ Although we cannot predict what advanced weaponry the rapidly changing technologies will develop, we can be sure that aerospace power will play a decisive role in the outcome of future wars.

SECURITY THREATS ON THE KOREAN PENINSULA

The Strategic Environments and Security Threats

Though the New International Order which came about with the collapse of the Soviet Union in the 1990s has not yet reached its potential dimensions, Francis Fukuyama has caught our attention with his famous characterization of today's period as "the end of history" and

¹⁷Giulio Douhet, *The Command of the Air*, p. 30.

his statement that "what we may be witnessing is not just the end of the Cold War, or the passing of a particular period of postwar history, but the end of history as such: that is, the end point of mankind's ideological evolution and the universalization of Western liberal democracy as the final form of human government."¹⁸ He argues his optimistic view by interpreting the past in the following way: "... for human history and the conflict that characterized it was based on the existence of contradictions. . . But in the universal homogeneous state, all prior contradictions are resolved and all human needs are satisfied. There is no struggle or conflict over large issues. . . "¹⁹

On the other hand, the more pessimistically inclined Samuel Huntington argues that "the end of the Cold War does not mean the end of political, ideological, diplomatic, economic, technological or even military rivalry among nations. It does not mean the end of the struggle for power and influence. It very probably does mean increased instability, unpredictability, and violence in international affairs. It could mean the end of the Long Peace."²⁰

Regardless of varying interpretations such as these, the end of the Cold War can certainly be said to have brought about many changes in the international system. Today's economic, national, religious and racial conflicts, the steady increase in traditional armament as seen particularly in the Middle East and Northeast Asia, and the proliferation weapons of mass destruction throughout the world,²¹ are clear signs of post-Cold War strategic insecurity. The Gulf War and the Kosovo Conflict are prime examples of this insecurity.

In this strategically insecure international environment, the Korean peninsula exists in a Cold War situation of confrontation that is just beginning to enter a transitional period, riding the tide of international changes. North Korea, in the midst of economic decay,

¹⁸Francis Fukuyama, "The End of History," *The National Interest*, Summer 1989, p. 2.

¹⁹Francis Fukuyama, *Ibid*, p. 3.

²⁰Samuel P. Huntington, "No Exit: The Error of Endism," *The National Interest*, Fall 1989, p. 6.

²¹Former Defense Secretary William J. Perry sees the potential security threats on the horizon: Weapons of mass destruction could spread to nations hostile to the United States, such as North Korea or Iraq, in his book, "Preventive Defense" (*The Korea Herald*, March 16, 1999.)

has shown signs of structural collapse. Despite this, it continues to strive for a communist unification of the peninsula and to make political, diplomatic, economic and military responses very difficult because of its constant nuclear and chemical weapons threats. It is widely known that the security on the Korean peninsula is, in the short run, directly related to the situation in the North. It is also closely related to the strategic situations of neighboring nations. In fact, the entire Northeast Asian region is representative of the elements of strategic insecurity inherent in the defunct Cold War international system.

China is moving away from its past territorial centered defense policy and is rigorously trying to construct a modern military through its so-called "Positive Offshore Defense" policy which attempts to interdict an enemy before it reaches Chinese territory.²²

Japan, which has been under pressure from the United States since the 1980s to increase its military commitments, is now increasing its military power. In 1993, Japan announced the adoption of the "Miyazawa Doctrine." Under this doctrine, Japan plans to build a political superpower suitable to the strength of its economy. In 1997, the United States and Japan concluded an agreement on guidelines for closer defense coordination. Despite the agreement's call for pan-Asianism, many see Japan's increase in military, political, and economic influence as a harbinger of its hegemony and the advancement of its military power.

Russia is still suffering from political and economic problems stemming from the fall of the Soviet Union, and it is predicted that it won't be able to overcome its severe domestic problems for some time to come. However, its military influence is still strong in the international arena. There is reason to surmise that, to gain popular support and recover its past glory, Russia will strengthen its military influence, especially in the Northeast Asia region.

Although the United States is not a regional member of Northeast Asia, it is the main superpower in keeping world order after the Cold War era, and it is a prime influence in the Northeast Asian region. There is every indication that for some time to come U.S. military

²²*Chinese People's Newspaper*, September 15, 1989.

influence will remain necessary in this region. However, the imbalance in the power structure leaning toward the United States, and domestic problems arising out of economic ones have reduced the U.S. desire to become involved in numerous small-scale conflicts. This phenomenon is a result of the national security strategy of "engagement and enlargement" wherein the United States is trying to selectively engage itself in conflicts around the world that directly affect its national interests. This may well be an important variable affecting strategic insecurity, not only on the Korean peninsula, but in the whole of Northeast Asia.

In this new international order, the Northeast Asian strategic environment displays more insecurity than it did during the Cold War era. The situation on the Korean peninsula is complex, comprising an acute confrontational position between the North and the South and various interactions regarding national security with the neighboring powers such as the United States, Russia, Japan, and China.

Even though the safeguarding of a nation from military offensives is not the only objective of a government, it is the absolute condition for the pursuit of democratic social values, such as political freedom. If a country possesses a certain level of military force to maintain national security, then, to be sure, that military force must be viewed as a liberating one enabling the nation to use its energy and resources for other purposes, such as development. Thus, military force itself is a mandatory element, not only of national security, but also of prosperity.

The two Korean states and their neighboring countries recognize the usefulness of increasing their military power. Unfortunately, however, efforts toward expansion in this area sometimes cause political conflict and, with this, the possibility of military conflict also exists, where one state's security comes to be defined as another state's insecurity.²³ Given this perspective of Northeast Asia's security environment, it is possible to analyze and predict the extent of military threat in the area.

²³"...one state's security comes to be defined as another state's insecurity. . ." Donald Puchala, *International Politics Today* (New York, N.Y.: Dodd, Mead & Company, 1971), p. 76.

North Korea is a present danger for South Korea and it will remain so in the near term. In the early decades of the 21st century, however, its threat will decrease gradually. However, even though North Korea is showing signs of collapse, if it does not abandon its goal of communist unification, the threat of full or limited war caused by a North Korean invasion of the South will continue to exist. North Korea may already possess nuclear arms and surface to surface ballistic missiles such as the No Dong I and II and Taepo Dong I, with a radius that can reach neighboring countries. North Korea launched a three-stage Taepo Dong I missile last August, insisting that it merely put a small satellite in orbit to briefly broadcast a song in praise of the late Kim Il-Sung. "While we expected a Taepo Dong I launch for sometime, its use of a small third stage in the attempt to deploy a very small satellite was not anticipated,"²⁴ U.S. State Department spokesman James Rubin said in a press briefing.

Although the Taepo Dong I still has technical kinks to be worked out before it can deliver a small payload at intercontinental range, the new and improved Taepo Dong II could deliver a somewhat larger payload. "North Korea could be able to test-launch this missile in 1999,"²⁵ said Rubin. Taking this into account, we must recognize that should a military conflict occur, the possibility of mass killing due to nuclear-bio-chemical weapons could be a rather high possibility.

The concerns surrounding North Korea's possession of nuclear sites in Yongbyun and Kumchang-ri and ballistic missiles are not limited to the Korean peninsula. The fact that a country like North Korea, recognized as a terrorist country by international society, possesses a nuclear delivery capability is closely related to issues regarding the proliferation of nuclear weapons and could become a serious international political problem.

Korea also confronts problems with its neighboring countries that must be solved through diplomatic means. However, it must consider the potential military threat from neighboring countries and it cannot afford to lessen its military preparation. There is a possibility that conflicts could arise with regard to the environment.

²⁴*The Korea Herald*, February 5, 1999.

²⁵*Ibid.*

After unification, China's northern border claims and Japanese claims on Tokdo, and disputes over marine resources and sea lanes of communication could also create conflict. Although it does not have a direct relationship to Korea, the South China Sea dispute between China, Taiwan, Vietnam, and the Philippines, the Diaoyu/Senkaku dispute between China and Japan, and the Kuril Islands dispute between Japan and Russia could all have an indirect effect on Korea's security. Therefore, Korea should also prepare for these kinds of indirect threats.

Future Warfare on the Korean Peninsula

Today the Korean peninsula is a region with a high potential for a major conflict, possibly more so than any other region in the world. Korea has spent 46 years with a cease-fire agreement, but without a peace treaty. Both sides have maintained intensive war preparations. As a result, both North and South Korea have strong military capacities, capable of causing massive destruction on both sides.

The military power possessed by the two Koreas developed as each responded to the other's military force and each focuses on winning through consecutive decisive battles. If a war breaks out in the current situation, North Korea would undoubtedly attempt rapid penetration of the South, using its superior numbers of troops, tanks, aircraft, maneuvers and firepower to try to destroy South Korean forces quickly. It is believed that the North would attempt to penetrate rapidly into the deepest zones of the South, employing special forces to establish a second frontline and using a fighting concept, such as the operational maneuver group tactics used by the former Soviet Union or the guerrilla warfare favored by Mao Zedong. The possibility exists that North Korea already possesses nuclear arms and surface-to-surface ballistic missiles such as the No Dong I and II and Taepo Dong I, with a range capable of covering all of South Korea.

In response to such North Korean military strategies, the South, under the Korean-U.S. combined defense system, would apply the U.S. air-land battle operations concept. This would establish three-dimensional maneuver warfare. By quickly responding, South Korea could achieve dominance at an early stage of the war and,

subsequently, by means of its offensive defense strategy, achieve military victory and the unification of the Korean peninsula.

A nation's security environment should be viewed within the context of the regional constellation of which it is a part. History teaches us the lesson that the composition of such constellations fundamentally operates according to the principle of power. Korea's neighboring countries are some of the most powerful in the world, and they stand to possess much stronger national and military power in the foreseeable future. As noted earlier, conflict could arise between Korea and its neighboring countries over marine resources, territorial disputes, environmental issues, and sea lanes of communication. Furthermore, conflicts between neighboring countries could also have an indirect effect upon Korea.

Most of these elements of potential conflict should be resolved through political and diplomatic methods. However, military power lends force to these methods, thus playing an important role. Military power is also a last resort to be used in the interests of national security. If we consider size, characteristics and methods, the use of force in conflicts between South and North Korea and in conflicts between Korea and its neighboring countries would be viewed as fundamentally different. The reason being, first of all, that the purposes for using force would be different. A war with North Korea would be for survival, while a war with a neighboring country would be for national interest.

If a war should occur with a neighboring country, it would be characterized as a local limited war with a limited number of targets. Its aim would be to force subsequent political negotiations. Korea's neighbors possess highly modernized weapons systems and they have the capability to do severe damage to the Korean center of gravity in a short period of time. For this reason, if a conflict should occur with a neighboring country, the method of response would be determined by the objective, the size of military force, the level of modernization, the war fighting capacity of each unit, and its employment. Unlike war against the North which would follow Alvin Toffler's so called "second-wave" pattern of warfare, using massive firepower and maneuvers, war with Korea's other neighbors would

likely be limited to “third-wave” warfare.²⁶ These conditions of facing two distinct types of potential warfare make it impossible for South Korea to work out a single military strategic objective. Instead, South Korea must prepare for two very different and complex types of war.

KOREAN AEROSPACE POWER STRATEGIES AND MILITARY POWER CONSTRUCTIONS

Military Power and Aerospace Power Strategies

Military power is an element of national power just as are politics, diplomacy, economics and scientific development and, like these, it has its own methods to accomplish its particular purpose in the overall schema of national power. Every writer on military or naval affairs has a different definition of strategy. For example, Liddell Hart writes that it is “. . . the art of distributing and applying military means to fulfill the ends of policy. . . ,”²⁷ Karl Von Clausewitz defines strategy as “. . . the use of the employments for the object of the war. . . .”²⁸ Rear Admiral J. C. Wylie, U.S. Navy, writes that strategy is “. . . a plan of action designed . . . to achieve some end: a purpose together with a system of measures for its accomplishment. . . .” Former Professor William P. Snyder of the Air War College points out that two elements are common to all of these definitions. The first is an objective, a goal, something that is to be accomplished. For Liddell Hart, that objective is “the ends of policy”; for Clausewitz it is “the objective of war.” The second common element in these definitions is that military strategy is seen as something to work with, it is a resource or, to use a more currently popular word, an asset.

What links resource and objective together is a plan. The definition of strategy embraces all three concepts: objective, resource, and a

²⁶Alvin and Heidi Toffler, *War and Anti-War: Survival at the Dawn of the 21st Century* (Little, Brown and Company, 1993) pp. 38–43, pp. 64–80, “The Industrial Revolution launched the Second Wave of historical change. . . and war once more mirrored the changes in wealth creation and work. . . . Something occurred in the night skies and desert sands of the Middle East in 1991 that the world had not seen for a new form of warfare that closely mirrors a new form of wealth creation . . . more accurately, it applied two different war forms, one Second Wave, the other Third Wave.”

²⁷Basil Liddell Hart, *Strategy: The Indirect Approach* (Praeger, New York, 1954) p. 4.

²⁸Karl Von Clausewitz, *On War* (Princeton University Press, 1976) p. 128.

plan tying the two together. To put the definition in a military context, military strategy is a broad concept that includes a military objective and a plan for achieving that objective by means of military resources.²⁹ General Maxwell Taylor, the former U.S. Commander in the Vietnam War, also said that military strategy includes objective, method and means. His definition is very close to that of Professor Snyder who says that the core elements embodied in strategy are an objective, a plan or concept, and resources.

We find the definition only slightly altered in General Andre Beaufre's notion: "la Strategie Militaire s'agit de l'art d'employer les forces militaires pour atteindre les resultats fixes par la politique."³⁰ The military strategies discussed by these military strategists include every kind of military power that one nation might possess. Air power is one of the components of military power and it is the most practical one for accomplishing particular objectives.

The air power doctrine of the Royal Air Force states: "air power strategy is the comprehensive plan for employing air power during wartime."³¹ However, when we add to this notion the three elements of development, deployment, and employment which any military strategy must consider, then air power can be understood as a way of thinking that develops, prepares, and employs air power according to the dictates of national policy.

Air strategy may have a specific practical objective in its employment but, fundamentally, air power has the same objective as an overall military strategy. Not too long ago, when air power's chief role was to serve as an extension of firepower and be there only to support ground and naval forces, there was a gap between an air power employment objective and an overall military strategy. Today's aerospace power, which now contains strategic effects, has narrowed the gap between strategy and tactics and, with that, it has also narrowed the gap between aerospace power's employment objective and the overall military objective.

²⁹William P. Snyder, *Strategy: Defending It, Understanding It, and Making It* (Air War College, Air University, Maxwell AFB AL, 1 June 1995, p. 8.

³⁰General BEAUFRE, *Introduction a la Strategie* (Librairie Armand Colin, 1965) p. 15–16.

³¹Royal Air Force Air Power Doctrine (RAF, 1991), p. 18.

If aerospace power's inherent practical objective for achieving Korea's military objective is to deter war in peace time and to bring victory during times of war, then its fundamental objective is also the same as Korea's overall military objective. To achieve this mutual goal, the Korean concept of aerospace power must encompass the objectives of its employment in order that capabilities and resources be secured for the achievement of those objectives.

DETERRENCE AND COMPELLENCE STRATEGIES IN PEACE TIME

In his discussion on military strategies and political objectives, Robert J. Art writes, "although there may be differences depending on each nation's objective and goal, the military's contribution to a political objective takes four shapes of defense, deterrence, compellence, and demonstration."³² Let us take a look at these shapes. First, a defensive use of military power means to defend against enemy attack before it occurs, or when attacked, its objective is to minimize the damage incurred. Here the aim is at the potential or actual forces of the enemy. Defense can be nonviolent but it does not avoid the use of violence. Defensive military power is applied when there is a clear threat of attack from the enemy, in which case defense consists of conducting a preemptive attack. Defensive military power is also applied after an attack. However, since the advent of absolute destructive weapons such as nuclear weapons, it is no longer possible to assume that a nation can even survive a first attack. Pragmatically, therefore, the defense strategy has been abandoned and deterrence has come to be recognized as a more realistic alternative.

The deterrent use of military power, the second of the four delineated by Robert J. Art, dominated strategic thinking during the Cold War era. Thanks to the proliferation of nuclear and long-range missiles after the 1950s, it became paramount that a collision of two military forces be avoided. Hence, deterrence became the dominant mode of military strategy. In past strategies, the use of power and technology were the main focus, but all this changed with the

³²Robert J. Art, "The Role of Military Power in International Relations," *National Security Affairs* (London: Transaction Books, 1982) p. 27.

dominance of deterrence. Instead, what we might call a disuse, or the avoidance of the use of power and technology became the main focus. As a strategy, deterrence can best be defined as getting “a message” to the enemy that severe damage to its territory can be inflicted; and when the enemy correctly reads this message, the information in it deters them from engaging in any activity that might trigger such an event.

In other words, deterrence works to prevent undesirable situations by threatening and making the enemy realize that there is more risk than benefit in taking an antagonistic action. How the enemy responds to the information in the message determines the effect of deterrence. If the threat fails and force must be used to retaliate, then deterrence has failed. However, sometimes the reasons why deterrence fails as a strategy are unknown to the participants of either side.

Cultural differences and perceptions sometimes cause a threat to be interpreted in a way other than intended, and often times the deterring message and the method of delivering it to the presumed aggressor are interpreted differently by sender and receiver. Sometimes, too, conflicts arising from a sudden situation or nonrational or illegitimate activity cannot be deterred. The environment of military strategies in today’s world, characterized as it is by various stages of transition, certainly points up the notion that there are limits to deterrent use of military power as a means to prevent conflict including small-scale or low-intensity conflict.

Let us turn now to the third contribution of military power, compellence strategy, and see how it fares in today’s world. A compellence use of military power should influence an enemy’s decisions and actions by making them feel pain or damage. If the enemy has already made its decision, then through the use of military power it may be influenced to retract its action or stop an undesirable action.

In his book, *Arms and Influence*, Thomas Schelling notes: “the problem of compellence, that is, convincing an enemy to stop an attack once it has begun, or to change its behavior in other ways, is essentially similar to the relationship between these two forms of co-

ercion.”³³ Alexander George defines compellence as “threatening another nation in order to stop its action, or return to its original state what they have done or return whatever they have accomplished.”³⁴ In other words, compellence can be defined as deterring the enemy from starting any adverse activity. If they have already begun their adverse activity, then compellence, like deterrence, would involve stopping the enemy from achieving its objective and making enemy leaders repair damages that have already been inflicted.

Robert J. Art contends that “the compellence use of forces is for both peaceful and physical purposes.”³⁵ In compellence, the use of force for peaceful purposes should work toward a diplomatic conciliation. This, of course, involves talk, negotiation, and compromise. But there is also another use of force common to compellence, and that is the use of a punishing attack to persuade the enemy to retract or take another stance. We see that force is used when threat is not “compelling” enough. But it must also be carefully orchestrated. When force is necessary, it should be limited and selective and its aim should be to clearly make the enemy reconsider or bring an early end to the conflict with terms agreeable to both sides. Strategists consider that compellence is both possible and effective not only for purposes of experimental and selective control, but for maintaining a steady state of control as well.

There are, of course, differences between deterrence and compellence strategies. Deterrence uses passive force in order to prevent any potential action before it occurs, but compellence actively uses force and considers further action and the enemy’s responses to those actions. Compellence strategy appears to have a clearer objective than deterrence, however because the objective must take into account the opponent’s possible reactions, planning can be complex and difficult in actuality. Deterrence can temporize a situation through appropriate deception or dissembling, but compellence requires an outward, observable change based on the enemy’s clear understanding of the compellence message. The nature of dissem-

³³Thomas C. Schelling, *Arms and Influence* (Yale University Press, 1967) p. 2.

³⁴Alexander L. George, *The Limit of Coercive Diplomacy* (Little Brown & Company, 1971) p. 23.

³⁵Robert J. Art, *Ibid.*, p. 27.

bling and deception is disguise and obfuscation, not understanding. Therefore, compellence strategies must always avoid being involved with any sort of deterrence method that calls for disguise in any form. Despite the restrictions put upon delivering the compellence message, it is hailed in the arena of international relationships as the third strategy to use because it is recognized as a viable alternative to the limitations imposed upon defense and deterrence strategies by weapons of mass destruction. The Cuban Missile Crisis in 1962 and the Gulf War in 1991 led by the United States are two good examples of the use of compellence strategies.

The multinational forces forced the Iraqis to give up their intention by steadily increasing the level of compellence through isolation. Such gradual and successive coercive methods coincided well with the "politically oriented limited military employment" concept, demanded of modern military employment. Furthermore, since coercive methods were employed with clear intention and calculation, they were typical representations of compellence strategy. With the enactment of these coercive methods, the first stage of compellence had begun and, in this way, the United States and international society unequivocally made known their intention and demanded that Iraq give up its will and cease its aggression toward Kuwait.

It is true, however, that, in the Gulf War, Saddam Hussein did not abandon his intention early in the day as had Nikita Khrushchev, the former Soviet Union leader during the Cuban Missile Crisis. In fact, he did not give up his intention even when he recognized that his efforts were failing. Iraqi leadership stupidly waited until its national defense was completely paralyzed and only then did it accept the United Nations' proposal. Does this sort of example demonstrate that the compellence strategy is a failed one that has seen its day?

My answer to this is no. Something else was operating in this situation that is not always present in other similar situations. If Iraq had a more rational decisionmaking process at its disposal, the decision to accept the United Nations' proposal would have been made much sooner, at the least when it became clear that Saddam Hussein's military strategies were failing. Military strategists who favor the compellence strategy often appear to take for granted that the enemy nation is one which operates under a rational deci-

sionmaking mechanism, perhaps, one much like their own. In making this unfounded inference they unfortunately ignore the pervasive influence of cultural perspectives and the effect of one's culture upon one's world and political views.

When trying to test the intention and will of enemy leadership through a compellence strategy, their national cultural characteristics, political ideology and military doctrines must all be considered because these always have a profound effect upon the manner in which a particular nation responds to a coercive action. In other words, before choosing to use a compellence strategy, the opponent's will must be clearly analyzed in terms of cultural perspectives. If cultural characteristics and world views are not considered, the scope of the conflict might actually be expanded.

If one's national and military power is not significantly superior to those of the enemy, then it might not be prudent to consider the use of a compellence strategy. In using a compellence strategy, one must be prepared not only to increase the level of threat but also be prepared to carry out one's threats if the enemy's responses so demand. An empty threat does no more than increase the enemy's will.

Indeed, it is important to ascertain the tenacity of an enemy's will, and its intention to carry out that will. A carefully researched assessment of the enemy's will should determine the level of the compellence strategies to be used. War is an intricate calculation of benefit and loss. Conflict occurs when the benefits for engaging in it appear to be greater than any losses that might be incurred. And it is avoided only when the losses incurred appear to be greater than any benefit to be had by initiating or continuing the conflict. The argument to increase the level of loss in order to overcome the enemy's force of will, rests on the credibility of the threat.

If, for example, a nation has a strong will to maintain its national security, then, even though it may not possess superior national or military power, it can deter the enemy. A nation fully determined to protect its national security can use destructive force as a compellence strategy, without escalating or expanding the conflict. Indeed, we saw this very phenomenon when Israel responded to Iraqi effort

to possess nuclear bombs by destroying the Osirak atomic plants on August 5, 1981.

As noted earlier, over the last ten years, many regional powers have greatly accelerated their weapons development, consequently and with good cause, international concern has also increased with regard to the proliferation of weapons of mass destruction. If Iraq had possessed nuclear arms, the Gulf War would have had completely different characteristics. If a leader such as Saddam Hussein possesses nuclear arms, then he probably does not plan to use them for purposes of deterrence. His inhumane use of weapons of mass destruction during the Iran-Iraq war provides ample evidence for this belief. Finally, we must be concerned with whether and how international pressure and restrictions will actually stop leaders such as Saddam Hussein or Kim Jong Il of North Korea from trying to develop weapons of mass destruction.

Even though the international community is in accord that peaceful methods such as pressure and restrictions must continue as efforts to stop irresponsible leaders from producing weapons of mass destruction, the past history of such cases does not show satisfying results. If peaceful methods do not work, then the use of force must be carefully considered. The Israeli decision to destroy Iraq's nuclear production facility must have been a difficult one. Nonetheless, this bold, practical effort to stop the danger Iraq presented must be admired. Israel could not break Iraq's will by its attack, yet using force was probably the only viable method by which to stop production of the nuclear bomb.

Violent use of military power in this case was certainly an extension of politics and the message was that the benefits of continuing the conflict were not greater than the losses would be. It is a widely known truth that if loss from a war is so great that it renders benefit meaningless, then at that point, war will cease to exist. Putting it in a different way, deterrence of war must be based on the credibility of retaliation.

South Korea, like Israel, has a fundamental need to deter war. It has much reason to retaliate against provocation and aggression in order to deter such acts as well. South Korea's level of need and provocation is different from that of Israel, however. Of course, a nation

need not respond to provocation in a military way. It is possible to respond in a nonviolent mode, such as seeing to it that the aggressor nation is politically, diplomatically, or economically isolated. A deterring retaliation is most efficient when its objective and method are commensurate to the provocation. If the provocation has been very violent and cruel then, to be credible, the retaliatory measures must be powerful, for only if the aggressor nation feels the will and determination will it find cause to desist from carrying out its will.

For example, South Korea and the United States have never carried out a retaliatory action in response to North Korea's many provocations, a list which includes the so-called "1-21 Incident" in which North Korea attempted to raid the Blue House in 1968, the capture of the Pueblo intelligence ship in 1968, the downing of the EC-121 in 1974, the Panmunjom axe incident in 1976, the terrorist bombing at Awungsan in Myanmar in 1983, the blowing up of a KAL airplane in 1984, or the infiltration by submarines in 1996 and in 1998. The reason South Korea and the United States have not sought to respond to these provocations with a show of force has partly been due to political considerations, but it has also been due to the fact that they simply did not have the military means available to use in any sort of response that would guarantee victory.

The very fact that North Korea persists in its challenging activities indicates that the South's deterrence has failed and that North Korea still has its will and intentions intact. In other words, South Korea and the United States failed to teach a lesson to North Korea, because they did not adhere to the law of international society which insists that "challenging activities will lead to retaliation." In the end, what has happened is that South Korean and U.S. credibility for deterrence has been seriously undermined, and, in its weakened state, provides incentive for North Korea to continue its violent provocations.

The times have long demanded that military strategies take into account the potential for mass destruction and annihilation which now exists in the world. It is naive to think that the steady provocations of North Korea will not escalate to intolerable levels. South Korea should take heed of the inherent dangers of inaction and acquiescence and develop a military means of deterrence while, at the same time, it should devise military retaliatory measures, to be used

at times of challenge, which would serve to deter North Korea from continuing its violent acts of provocation. If South Korea could prove its credibility by a show of its determination and ability to powerfully retaliate, then the North would be far less likely to engage in violent provocation.

The first point of a compellence strategy is to so influence an opponent that it will not continue its course of aggression; the second, upon which the first is most dependent, is that the compellence strategy employed must reflect the user's will and determination. In South Korea's case, it is no more than prudent that it be prepared to meet challenges from neighboring countries or from North Korea. The security environment in Korea is quite tense at this time. As noted earlier, there are conflicts with neighboring countries such as the resources problem in the Yellow Sea, the Tokdo dispute, the territorial dispute, and environmental problems that have contributed to this tense security environment. If it is to survive the possibility of a neighboring country's attack, Korea needs to possess the ability to carry out a compellence strategy.

Compellence strategies can be used in peace time and in a limited war but not in a full-scale war. The logic in this guide for use is apparent; a large scale war can be in effect only if compellence strategies have failed and, at such a point, compellence can not resolve the conflict.

Military strategy must have, as its basis, an objective that is a conceptual notion of military employment. With this, it must also have the means to carry out its objective. Needless to say, there must also be a reason for the compellence. Just cause is not enough, however. One must also know how to achieve the strategy's aim and possess the military capability to realize that know-how. Clearly, acquiring the military force to put a compellence strategy into action, is the highest priority for preparedness.

Korea's strategic environment is one that faces terrorist activity from the North. It is constantly confronted by the possibility of a limited war which, in turn, possesses the spectre of a full-scale war. If we look ahead at the possibilities for conflict inherent in the present situation with neighboring countries, it is easy to observe that South Korea has a more-than-ordinary need to see that compellence

strategies are put in place. For this reason, South Korea should develop and employ compellence strategies in addition to deterrence as part of its national strategy and acquire enough military power to put compellence strategies into action. This should have a higher priority than any other area of development.

Sustaining peace and achieving a peaceful unification of Korea in the long run are South Korea's objectives and, unless there is some sort of military invasion, we are not considering preventive attack.³⁶ President Kim Dae-jung's top priority is to eliminate the possibility of war on the Korean peninsula permanently and to do so in close cooperation with neighboring countries. To this end, the Korean government has devised a Comprehensive Engagement Policy, the so-called Sunshine Policy, and plans to pursue a multilateral Northeast Asian security organization which would include South Korea, North Korea, the United States, China, Japan, and Russia. The goal of such an organization would be to improve security around the Korean peninsula and construct a consolidated regional security order.

Peacetime forces should focus on securing a strategic environment so that nonmilitary resolutions for peacekeeping and peaceful unification can be effective. Under our current national policy, deterrence is our primary policy; and if it fails, we go into a defense mode. Defense and deterrence are our basic objectives in military strategy.

Recent scientific and technological developments have brought about an imbalance in the destructive capability of weapons. On the first strike, deadly damage to an industrialized and urbanized country can occur. That this can be done may become the reason for such an attack but, it can also become a reason to devote our attention to devising methods for preventing such attacks. Even though a nation has convincing deterrence capability, it still can not deter every potential war situation. When we look at today's global strategic environment, we can not escape concluding that enhancing the credibility of deterrence and preparing for any violent conflict needs to be the highest priority of all nonaggressive countries. Korea surely can be no exception.

³⁶*Defense White Papers 1997–1998* (Ministry of Defense, Republic of Korea 1998) p. 4.

If the main objective of compellence strategy is to destroy the enemy's will through force and to increase the efficiency of deterrence, or if deterrence fails to stop the enemy's challenge and normalize the situation, then Korea must overcome its limitations in deterrence and put into practice compellence as a national strategic objective.

Aerospace power, with its surprise attack capability, dynamic employment, and precision destruction capability, is the strongest candidate on the list of compellence strategies. Aerospace strategy, practical for a national strategy, must be well employed in order for it to support achieving the national objective. If South Korea's national strategies are to include the concept of compellence, then its aerospace power employment concept must be redefined and developed in order to construct appropriate compellence strategies and their necessary strategic military power supports.

Parallel Warfare for a Wartime Strategic Paralysis Strategy

South Korea always faces the threat of invasion from the North, and should therefore establish a military strategy to meet such full-scale confrontations, too. This chapter argues it should establish a credible compellence strategy for peacetime, as well. There is no other way to prevent the North from the continual probing challenges that have marked their relationship with the South since the Korean War, and support the national objective for unification at the same time.

As noted earlier, North Korea could attack with conventional warfare employing its superior number of troops, weaponry, and fire power, and invade from the rear with its special forces using nonconventional warfare. In this way, it could try to destroy the South's major force and destroy its will to fight. An attempt such as I have described could as Alvin Toffler predicted in another context, be the start of a war employing the so-called second wave pattern which depends on powerful, yet poorly maneuverable machines, and focuses on the destruction of military force.³⁷

³⁷Alvin and Heidi Toffler, *War and Anti-War*, pp. 122–124.

If North Korea should use this second-wave pattern of war, how would the South respond? Knowing what we do about North Korea's capability, we can predict that any full-scale confrontation with them would be fierce. We might also predict from history, ancient and recent, that South Korea's response could not only mitigate the potential damage, but end the confrontation quickly. Let us look at the Iraqi war once again. Like the advent of the arrow and the spear in battles using swords, armored vessels in trench warfare, or the shock of the German's blitzkrieg against defense-oriented France, the U.S.-led multinational force in the Gulf War was a shock to the Iraqis. The strong Iraqi force collapsed without much of a fight.

Even though we predict that any war on the Korean peninsula will be a fierce battle with firepower, maneuvers, and without front and backlines, if South Korea has a strong strategy concept in place and the military capability to neutralize North Korean forces, we can also credibly predict victory for the South. Should the North attempt a war aimed at the South's territory and military force, the South, prepared as I have described above, could destroy the North's command and control system, neutralize its communication system, and paralyze North Korea by means of selective annihilative destruction so that it would not be able to efficiently deploy its forces. In this way, the South could not only avoid massive destruction and casualties and arrest destructive damage, it would also achieve victory within a short period of time, and the Korean peninsula would be undemolished and geographically intact.

If South Korea possessed a strong aerospace power that could destroy the enemy's center of gravity with parallel warfare, then, at the start of a war, the South could destroy the enemy's command, control and communication means through selective destruction and neutralize them. Because Seoul is the center of politics and the nation's economy, and because it has such a large population and is very close to the frontline, it is not a sufficient geographical zone in which to absorb the shock of attack. For this reason, the South's response method needs to be twofold and can not focus on strategically paralyzing the enemy. The North's war intent is not to put limitations on the South's political will. Rather it aims for the collapse of the South's political system, and this would lead to a war that not only would be selective, but annihilating as well. Here the words selective and annihilative refer to the method of destruction. Selective

destruction focuses on breaking the enemy's will so that it can't use its force, while annihilative destruction focuses on destroying the enemy's military force, thus neutralizing their will to resist.

Selective destruction chooses only high-priority targets and attacks only certain selected ones. Munitions that have low precision are not used, only precision guided munitions (PGM) are, so that unnecessary destruction of civilian areas and over-destruction of non-civilian areas is avoided. Selective Northern targets for aerospace power would be its major strategic center of gravity, such as the national leadership center, the C4I systems, major military facilities, industrial production facilities, complex weapons systems, and the air command system.

In order not to waste effort or have our forces incur damage, rather than simultaneously attacking everything with parallel warfare, expending massive aerospace force to do so, precise and strong forces, capable of inflicting sustained damage, should be used in selective destruction air operations. Selective destruction of this order could destroy North Korea's major targets. In addition, support organizations and systems can render North Korea unable to use its force.

An air attack on North Korea should be a thorough annihilative destructive one, as well. Annihilative destruction focuses on destroying the enemy's strategic center of gravity. In other words, a retaliatory annihilative air attack in response to provocation establishes credibility of will and, thus demonstrating determination and resolve to carry through, serves to make the enemy desist from its purpose. When we say that an enemy's system can be paralyzed through selective attack on major targets and its related systems, it should in no way be taken to mean that we intend to totally annihilate the enemy. What is meant is that we intend to paralyze its operational ability, (hence, to annihilate it) so there can not be even partial resistance.

The annihilative destruction methods described here are employed only after selective destruction has taken place and the enemy still possesses means to resist. It is to these means that annihilative destruction is applied. In this regard, we might look at ground forces that, for example, have lost their capability or been neutralized. In this kind of instance, after selective damage, it would be far more ef-

ficient to use ordinary weapons, or weapons that resist local use and have a high destruction effect.

In the Gulf War, the United States strategically paralyzed Iraqi targets through the use of three stages of air power with parallel warfare. Before the start of ground operations, the United States began to destroy the Republic Guards of Iraqi troops. Using the “Five-ring model” initiated by John A. Warden,³⁸ who planned the air campaign in the Gulf War, strategists analyzed the enemy as if it were a single system. By parallel attacks on Iraq’s core targets, which had a direct relationship to the national leadership, they were able to construct a parallel warfare plan which destroyed Iraq’s leadership and its nerve system.

South Korea’s military strategies and the North’s war intent share little in common with the events of the Gulf War. South Korea probably will not be able to possess more domineering aerospace power than will North Korea within the foreseeable future, and we can’t expect the North’s military force to greatly weaken any time soon. Bearing this in mind, we must assume that unless changes are deliberately made, the South probably won’t be able to conduct selective destruction and annihilative destruction operations. This being the case, it becomes imperative that Korea focus on building aerospace strategy and aerospace power construction capable of simultaneously conducting selective and annihilative destruction. Rather than simply employing a parallel warfare which focuses on selective destruction and paralyzes strategic targets and their related systems, we should concentrate on developing parallel warfare strategies capable of simultaneously conducting selective and annihilative destruction according to the situation of the battle.

³⁸John Warden, who makes the concept of an enemy system useful and understandable, makes a simplified five-ring model (Leadership–Organic Essentials–Infrastructure–Population–Fielded Military). The most critical ring is the command ring because it is the enemy command structure, be it a civilian at the seat of government or a military commander directing a fleet, which is the only element of the enemy that can make concessions, that can make the very complex decisions that are necessary to keep a country on a particular course, or that can direct a country at war. . . The next most critical ring contains the organic essentials. . . The third most critical ring is the infrastructure ring. . . The fourth most critical ring is the population. . . The last ring holds the fielded military forces of the state. John Warden, “The Enemy as a System,” *Airpower Journal*, Spring 1995, pp. 44–51.

Although our discussion so far has expanded upon the meaning of parallel warfare through aerospace power, this expansion does not simply signify increased aerospace power. This strategic concept is possible only if we employ strategic thinking and build a strategic air force capable of conducting parallel warfare in both selective and annihilative destruction modes. Therefore, an aerospace power-driven compellence strategy in peacetime could inhibit the North's will before damage is inflicted, and, should a full-scale confrontation occur, then aerospace power-driven parallel warfare strategy could be used to achieve strategic paralysis.

CONCLUSION

Depending upon the changes in where, how and with which means we choose to fight, the fundamental characteristics of waging war will necessarily change as well. It has not been a century since the advent of air vessels in war and air power has already become a revolutionary power, changing the pattern of war. The unfortunate situation of the early air theorists was that they overestimated the capability of their weaponry, strategies, and air fighting tactics. Now those capabilities have become commensurate with the early visions, and aerospace power has taken its position as the major military force within a century of its birth.

"The Persian Gulf War will be studied by generations of military students for it confirmed a major transformation in the nature of warfare: dominance of air power. Simply put, air power won the Gulf War. It was not the victory of any one service, but rather the victory of coalition air power projection by armies, navies, and air forces."³⁹ In other words, aerospace power was transformed from its past role of assisting in military strategy to conducting the military strategy itself. And it is being recognized more and more that aerospace power strategy will embody military and national strategies in the future.

South Korea must consider that security threats from North Korea and neighboring countries are greater than any posed to other Asian nations in this post-Cold War era. To meet the conditions of that

³⁹Richard P. Hallion, *Storm over Iraq: Air Power and the Gulf War* (Smithsonian Institution Press, Washington & London, 1992) p. 1.

threat, it must develop a strategic concept that encompasses not only the means of deterring a war but, should war occur, would have ready a strong strategy capable of destroying the enemy's intent. Aerospace power strategy is the core of compellence and parallel warfare strategies; there is no question that South Korea should concentrate on its development.

North Korea possesses a strong military force and its avowed aim is to unify Korea under communism. It has never slackened in its intent to invade the South with its superior number of troops, weaponry, and fire power. In responding to any future war threat then, the manner in which the South might strategically paralyze North Korea and, through annihilative destruction, bring about victory, will depend upon how appropriately aerospace power is used. Thus, in the event that South Korea needs to employ aerospace power strategies against North Korea, those strategies should comprise parallel warfare, that is, selective destruction to destroy the enemy's will and annihilative destruction to eradicate the power of its forces.

Winston Churchill once admonished us to examine our methods of war with the drama of a chillingly rhetorical question: "If the cost of victory is fatal damage then what use is a decisive victory?" In order to protect our nation and our goal of unification, I strongly advocate preparation for employing a compellence aerospace power strategy with parallel warfare in addition to a deterrence strategy. I believe that this combination will revolutionize South Korea's military power; therefore, it is my hope that it will become the new direction of Korean military power construction.

Some worry that a compellence strategy could result in a local or a full-scale war, but there is really strong cause not to make this assumption. In fact, there is more evidence to assume that as long as the North Korean regime understands that war would lead to its collapse, it will find a way to follow our guidelines and change its behavior gradually. Remember that the extremely dangerous crisis in 1994, that arose out of our concerns regarding North Korea's nuclear weapons program, was defused at the last moment by former U.S. President Jimmy Carter's dramatic meeting with Kim Il Sung in

Pyongyang.⁴⁰ Whether one argues that Carter convinced the North Koreans or whether his visit provided them with the face-saving means to deter from their plan of the time is immaterial. The point is, that in that instance, the North did receive the message and they did acquiesce.

President Kim Dae-Jung's Comprehensive Engagement Policy, the so-called Sunshine Policy⁴¹ which is believed by both the opposition and the conservative members of the ruling party to be a policy of appeasement, will gain more strength and will promote national security if a compellence strategy is employed. A compellence strategy will also help to unite the conservatives, and ease their concern regarding national security, since it will be a bona fide part of our national defense policy and military strategy.

I believe that we can more effectively contain any armed provocation and control the North's development and exportation of nuclear weapons and missiles by employing Korea-U.S. combined compellence strategies with the concept of parallel warfare for strategic paralysis, while we pursue the Sunshine Policy, which, after all, has the support of the four major powers. In this way, the Sunshine Policy, aimed, as it is, at opening North Korean society, will fully materialize a better relationship between South and North Korea and between the United States and North Korea. In the long run, the Sunshine Policy, bolstered by sound compellence and parallel warfare strategies and strategic aerospace power's construction, will truly accomplish the peaceful unification of Korea.

⁴⁰The United States had to seek the elimination of the North Korean nuclear program. . . On June 14, 1994, therefore, William Perry, the secretary of defense, called a meeting of the U.S. military leaders who would be most intimately involved if a military conflict broke out. General Luck flew back from Korea to report on his assessment of the situation, and how he would execute OPLAN (Operation Plan) 5027. . . Ashton B. Carter and William J. Perry, *Preventive Defense: A New Security Strategy for America* (The Brookings Institution, 1999) p.129.

⁴¹North Korea Policy of the Kim Dae-Jung Administration: first, South Korea will never tolerate any armed provocation that destroys peace; second, South Korea does not have any intention of pursuing unification by absorption of the North; and third, South Korea will expand reconciliation and cooperation with North Korea.

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**CHALLENGES IN RESEARCH AND DEVELOPMENT FOR
THE KOREAN AIRCRAFT INDUSTRY**

Tae Hwan Cho

INTRODUCTION

The aircraft industry is an advanced, complex technological industry that has a strong impact on other industries and, for the nation as a whole, it is a strategically important industry for strengthening international competitiveness through technological superiority. Developed countries throughout the world have been promoting the aircraft industry as an engine of continuous growth and development of advanced technology. The importance of the industry is acute in areas of maintaining superior defense technology, promoting rapid-growth industries, and improving productivity. In Korea, the industry is now in a period of growth, but this growth is still insufficient in light of Korea's national economic potential and phase of development. We can see many countries that are similar to Korea in terms of economic scale or industrial level but have achieved significant advancement by pursuing a more active policy for their aircraft industry. Countries such as Taiwan, South Africa, and Brazil are good examples. These countries have already shown indigenous models of aircraft in the world market. In contrast, it is regretful that the Korean aircraft industry still remains at the level of simple fabrication or parts assembly though subcontracts with foreign manufacturers.

The economic crisis Korea is currently experiencing may be said to have originated from the fundamental weakness in the competi-

tiveness of Korean industry and technology. In order to increase national competitiveness and to prepare for the upcoming 21st century, the country strongly needs more investment in and policy support to research and development in diverse technical areas including the aircraft industry. Technology is an integral resource of a nation in maintaining its competitiveness, particularly under the economic and technological regime of the WTO (World Trade Organization) and the TR (Technology Round). Paul Kennedy stated in his book, *The Rise and Fall of the Great Powers*, that the rise and fall, the prosperity and decay of a nation depend on the industrial competitiveness achieved through technological innovation. In the case of Korea, considering the security concerns of the Korean peninsula and the rapidly changing international situation, constant development of key defense technologies and new weapon systems is more important than ever. More specifically, aircraft development capability constitutes one of the most essential concerns because future conflicts will be waged with the support of sophisticated air forces. An advanced aircraft industry will also play a leading role in transforming the Korean industry structure from one characterized by low wages into one using technology to increase national competitiveness.

With this in mind, I intend in this chapter to review the current status of the Korean aircraft industry and present several opinions regarding both the R&D challenge ahead of us and our strategies to respond to these challenges.

CHARACTERISTICS OF THE AIRCRAFT INDUSTRY

An aircraft industry can be characterized as an aggregate system integrating almost all the nation's high-technology industry products. While it has a wide impact on various fields of industry, the industry requires a high level of investment and long development times. An aircraft is a complicated system composed of electronic, electrical, mechanical, and other subsystems, in which the reliability of each system's components is crucial. An aircraft can fly well when all the subsystems work reliably and interface with each other perfectly. Because constructing an aircraft is possible only when all related industries are well developed, the aircraft industry is generally prevalent among developed countries.

Several characteristics of the aircraft industry can be summarized as follows. First, an aircraft is a very complex and complicated system with many subsystems and components. Since compact, light, and multi-functional subsystems have to be integrated and interface well, constructing an aircraft can be defined as an integration of the subsystems in which high-technology experience is required.

Second, an aircraft must be highly reliable. Even a small defect in a component may result in a crash of the aircraft. No technical uncertainty is tolerated at any level of the system, i.e., at the component, subsystem, and system levels.

Third, the aircraft industry is a high-value-added industry based on specialized and technology-intensive labor. Most developed countries support the aircraft industry strategically to increase international competitiveness. To develop and produce aircraft, large-scale production facilities supported by significant investment and specialized technological labor are essential. Since the aircraft industry depends upon gains in production based on economies of scale, long term national investment and political support is required.

Fourth, the aircraft industry is essential for national defense. As one can see from history, military needs make up a major part of the overall demand for aircraft. As the nation's air force becomes the principal axis of military power, the aircraft industry develops into the backbone of the military industry. Eventually benefits from leading military technology will spill over into civil industries.

One of the reasons that developed countries support aircraft industry is to strengthen their defense capabilities and maintain their position in international society. They have developed their aircraft industries to extend their influence in the world rather than on the basis of the market laws of supply and demand. This policy will not be changed in near future. It is now well known that achieving a self-defense capability is not possible without an independent aircraft development capability. Developed countries have long considered promoting an aircraft industry as a basic strategy for national prosperity.

From an industrial policy perspective, promoting defense industries have had benefits for civil industry. For instance, the countries that planned to establish highly technical industrial structure and strengthen defense capability through the aircraft industry have al-

ready obtained beneficial results. Technologies developed through military aircraft development have had spillovers into the civil industries and have increased their national competitiveness. Israel, Taiwan, Japan, and China belong to this category. Unfortunately, in the case of Korea, though government support resulted in 80 percent of the total domestic market being composed of military demand, spillover effects on the civil industry and improvement of national competitiveness have not been as great as expected.

STATUS AND CONCERNS IN THE KOREAN AIRCRAFT INDUSTRY

Status of the Global Aircraft Industry

After the global aircraft industry passed a peak of prosperity in the 1980s, international competition became more intense. The competition became fierce and consolidation of aircraft companies was accelerated due to the reduction of military demand after the Cold War and a stagnation of civil aircraft demand was caused by the worldwide recession.

In spite of the reduction in demand for military aircraft, the leading industries invested in new aircraft development utilizing cutting-edge technologies, while consolidating competing companies to increase their capacity for survival. On the other hand, as a result of widespread promotion of the aircraft industry as a national policy in the countries of Southeast Asia and Latin America, more than 30 countries can now develop aircraft independently.

As the market decreases and competition increases in both the military and civil aircraft industries, aircraft industries around the world are exerting a great effort in increasing intrinsic and extrinsic competitiveness for survival. As a part of this effort, the leading aircraft companies are merging and strategically cooperating with each other. Cooperation is now occurring horizontally between developed countries as well as vertically between developed and less-developed countries. To reduce development costs and risks related to market uncertainty, the leading aircraft companies are consolidating in their own countries and have engaged in cooperation for codevelopment and coproduction with leading companies in other countries. The main reason behind this cooperation is the economic gain made by

avoiding duplicate investment and sharing the risk for development and production. By vertical cooperation, companies can take advantage of low-cost labor by moving manufacturing of simple components to less-developed countries.

Evolution of the Domestic Aircraft Industries and Achievement Through Major Programs

The South Korean aircraft industry started with the acquisition of facilities and equipment for depot-level maintenance of military aircraft in the 1950s. In the 1960s, efforts were focused on incremental improvement of depot level maintenance capability. In the middle of the 1970s, the 500MD helicopter was produced under license for the first time in Korea and F-5E/Fs were produced under license in the early 1980s. Since then, however, there was no definite government policy promoting the aircraft industry and a failure to create a new R&D program for military aircraft for a long while, leaving the existing production facilities useless. The government established a law for the promotion of aircraft industry in 1978. But this law only provided a basis for governmental support to the weak domestic aircraft industry without any meaningful contribution to the purposed promotion of the industry. In 1987, another law for promotion of the aerospace industry was established to support research and development activities. This again failed to initiate any distinguishing research and development program for several years.

Late in the 1980s, the government initiated the Korean Fighter Program (KFP), the largest defense program ever in Korea, for the dual purposes of strengthening the air force through acquisition of a main fighter aircraft and boosting the domestic aircraft industry. Although it was far more expensive (about \$1 billion), the program was purposely structured for production of the F-16 aircraft under license in Korea rather than direct purchase of a complete aircraft from the original manufacturer. It was expected to provide an opportunity for constructing the basis of an aircraft industry and acquiring technologies for development and production. This was a monumental investment considering that the total production of the domestic aircraft industry was only about \$200 million at that time. Although we were able to expand production capability through the KFP, other results were not as great as expected, such as in obtaining

core technologies in terms of fighter aircraft research and development.

From the early 1990s, Korea was able to begin development of aircraft such as the Chang-Kong 91 and KTX-1 independently. The KTX-1 program has been conducted successfully, thanks to production experience gained through the UH-60 helicopter program and KF-16 licensed production and the accumulation of research in governmental research agencies. When the KTX-1 program started, some people claimed that it was not wise to invest in developing a trainer aircraft and that buying them directly would be more economical. It is lucky for us that the government had the will to engage in independent research and development. Considering the exclusiveness of development technology in the global aircraft industry, independent aircraft development capability is quite essential for future expansion of our aircraft industry.

We have found, through the development of the KTX-1, that we could develop aircraft for our air force, for which we had to rely on purchases from developed countries before. This has increased not only our self-defense capability and aircraft industry capacity but also confidence in design and development of more advanced aircraft in Korea.

Concerns Within the Domestic Aircraft Industry

As described above, the aircraft industry has certain demerits of requiring huge investment, long periods of time for development, uncertainty in profitability, and reliance on government for much of the demand. However, considering the widespread spillover effects of the aircraft industry over other related areas, investment as well as direct and indirect support by the government are inevitable.

Government policy to support and regulate the aircraft industry seems to go against the prevailing global trend toward free competition and efficiency. However, while the theory of free competition and efficiency is an appropriate tool for expanding market share in advanced countries, it is not a fair framework to apply to a country where the aircraft industry is still in its nascent stage.

Concerns within our domestic aircraft industry can be summarized as follows:

- First, there are limitations in the domestic market. During the initial stages of development, aircraft industry grows based on the domestic market. Since the existing system of ground transportation offers sufficient coverage over the small landmass of Korea, there is no inherent need for air transport. Thus, domestic demand of aircraft, if any, was limited and developing civilian aircraft to produce only a few aircraft was not considered economical.
- Second, the structure of the aircraft industry compared to other domestic industries is relatively weak in terms of production base, capacity, and growth potential. Although there are many aircraft companies in Korea, they are all small in size and none has the capacity for research and development. In contrast, other countries have only one or two aircraft companies, with only minor exceptions in a few advanced countries. Consolidation of the companies to pursue economies of scale is a trend among the aircraft industries of the world. Contrary to the overall growth of our industries, which was as high as 26 percent in the last ten years, the trade deficit attributable to aircraft has been growing continuously and has become the largest trade deficit item.
- Third a severe lack of research and development capability has limited our aircraft industry to production of labor-intensive, low-value-added components through subcontracts with major foreign aircraft companies. Most investment has focused on simple component production accompanied by meager research and development for systems and subsystems. It is time to have an interest in training specialists in engineering and investing in research and development of aircraft for use in Korea rather than purchasing them directly from abroad.

LEVEL OF R&D AND PROSPECTS FOR THE DOMESTIC AIRCRAFT INDUSTRY

The representative industries of the Korean economy were the textile industry in the 1970s, the shipbuilding and construction industries in the 1980s, and the automobile and electronic industries in the 1990s.

In the 21st century, the Korean economy will have to put more emphasis on developing high value-added industries as the new engine of growth. If the aircraft industry is systematically fostered along with related industries, such as the machine industry and electronics industry, this will make a significant contribution to Korea's progression to the level of advanced countries in the near future. Various other manufacturing industries will become in turn more advanced by taking advantage of technologies derived from the aircraft sectors. For instance, these technologies will be extended to fields such as high precision manufacturing industries, high-tech new materials industries, system and process management industries, and so on. There will also be great progress in the service industry, which is to expedite globalization and localization of skills following niche areas of specialization. Certain people feel that the aircraft industry will not meet the expectations of becoming an independent and sophisticated industry, especially in light of current adverse domestic circumstances. A pessimistic opinion is that the expected spillover effects or value-inducing effects from the development of the aircraft industry will be very limited in the case of Korea, as indicated by the past record. However, this is because of a significant deficiency in initiative and investment in the aircraft industry, especially in the area of R&D.

The approach Korea has taken for the promotion of the aircraft industry was to specialize companies in terms of aircraft types—that is, to have one company specializing in fixed-wing aircraft, another in rotorcraft, and the like. This approach certainly has had some good aspects but it was not so effective in the aspect of technology accumulation. The conservatism prevailing among the companies made technology transfer and mutual cooperation more difficult. Also, different measures worked at cross-purposes because of a lack of coherent policies. In retrospect, not having from the very beginning a more intense focus on a specific company in order to nurture it to a level of international competitiveness was regrettable.

Korea is currently suffering an economic recession due to the Asian financial crisis. In order to recover from this recession and eventually to have strong competitiveness in the future international circumstances, Korea is in strong need of rapid development of science and technology through cooperative efforts from every realm of industrial, academic, and research institutions as well as the government.

One theory popular in developmental economics has it that the least developed among the developing countries cannot help but depend on exotic technologies and must be permanently subordinate to the industrially advanced countries due to a lack of an indigenous capability for technology accumulation. At the same time, an industrially advanced country has a long lead on the least developed country, since the former preserves high-level or primary core technologies and invests intensively in research and development. The latter will always have only the low-level or secondary technology. This theory might overlook the fact that such subordination could be surmounted through application of transferred technology and state-led efforts toward home-grown technology. The limitations of the above theory are shown in the case of newly emerging industrial countries in Asia, which have achieved rapid economic growth in the 1980s. At the end of World War II, the Japanese aircraft industry was extinguished, but Japan has revitalized its industry since conclusion of a peace treaty in 1952 and resumed industrial aircraft production despite a prohibition on the production of military weapons. The Japanese constructed an independent capability for an indigenous fighter aircraft with sophisticated technology. This accomplishment was largely due to consistent policymaking as well as systematic and organized R&D. Japan's policy to promote the development of fighter aircraft not only helped in terms of national self-defense but also contributed greatly to the development of its industrial structure and technological sophistication, particularly through spillovers into other industries.

After the United States placed a sales embargo on exports of its military fighter in 1965, Taiwan began to foster an aircraft industry with the dual purposes of accomplishing independent national defense capability and developing high technology through the promotion of the aircraft industry. Taiwan established the Aerospace Industry Development Center (AIDC), consisting of research and production facilities under the Ministry of National Defense. Taiwan also encouraged the growth of local companies to develop aeronautical weaponry. After a 30-year period, the total size of Taiwan's aircraft industry is more than four times that of Korea and three times that of Brazil.

Although Indonesia lags behind Korea in terms of economic scale and infrastructural development, the Indonesian aircraft industry is

distinguished by its focus on the commuter airline sector, the result of a particular government-led focus in this area.

These countries all set out to develop their own aircraft industries at the same time but have grown into quite distinct national industries, reflecting geopolitical as well as economic diversity between these nations. Nevertheless, what unifies these cases was the common conviction that the aircraft industry was a way to enhance national prestige; that the industry is an integration of highly sophisticated and modern technologies; and ultimately that this would be beneficial for national development.

The scope of the Korean aircraft industry is estimated at less than 0.2 percent of total domestic gross product of the manufacturing sector. In recent years, this value has gradually increased but it is still low in comparison with other industries; and it is in marked contrast to the aircraft industry of the advanced countries, where the ratio of the aircraft industry to the entire manufacturing sector amounts to 30 percent. It is therefore obvious that the Korean aircraft industry falls far behind in comparison.

It is essential to bear in mind that an aircraft industry is vitally necessary for the continued development of high technology and graduation into the status of an advanced country. Through successive production of military aircraft such as the MD-500, the UH-60, and the KF-16, there has been a limited spread of technology to other areas of manufacturing as well as areas of research and development. Also, as a result of the substantial experience gained from these projects, Korea now has a renewed sense of confidence in approaching ever more sophisticated projects such as the development of KT-1, KTX-2, and other projects involving nonmilitary commuter aircraft. Korea also has been attaining, and expects to attain, a significant transfer of technology through these endeavors.

Still, there is domestic criticism stating that the country should not undertake so many projects at the same time. While recognizing the concerns underlying this view, it is necessary to bear in mind the scale of commitment necessary to develop an aircraft.

An aircraft industry is not built in a day, and, as a rule, the technologies involved cannot be delivered by one effort, but instead must be nurtured over several phases spanning a significant period of time.

Typically among developing countries, the sequence of phases in the development of the aircraft industry can be characterized as follows: (i) a depot-level maintenance phase; (ii) a subcontract production phase; (iii) a licensed component assembly phase; (iv) a licensed system production phase; (v) a parts localization phase; (vi) an international cooperative development phase; and last (vii) the independent development phase. The Korean aircraft industry is approaching the cooperative development phase or independent development phase, having bypassed the licensed system production phase and the parts localization phase. In terms of level of technology, the Korean aircraft industry is comparable to levels seen in India, Turkey, and Argentina; and experiences significant lags in comparison to Japan, Taiwan, Indonesia, China, Brazil, and others.

It has been difficult to find objective and reliable assessments of R&D and technology level within each of these countries. However, I would like to address some of these issues using what research has been done so far.

In speaking of Korean industry, depot-level maintenance techniques and manufacturing and assembling of the airframe have been singled out as nearly approaching levels of sophistication seen in the advanced countries. In addition, airframe design capability shows latent potential for advancement as do other areas of manufacturing techniques. At the same time, severe deficiencies have been pointed out in the areas of parts production technology, in specific areas such as surface treatment, heat treatment, and basic materials, all of which are closely tied to the local machine and machine tool industry. Also it is recognized that the level of know-how related to system integration design, as well as test and evaluation, is low. These are acute deficiencies in our efforts at aircraft development. There are also similar relative weakness in avionics and flight control due to insufficient local R&D in these areas.

TASKS AND DIRECTIONS FOR THE DEVELOPMENT OF THE AIRCRAFT INDUSTRY

As discussed above, there are many difficulties in fostering the aircraft industry. But despite the difficulties, we are confident that we can never abandon the aircraft industry. The development of the air-

craft industry is an index measuring the level of sophistication of the general economy, and as is ultimately shown by the presence of advanced aircraft industries in most prosperous countries, this area simply cannot be neglected.

Since 1996, the Seoul Air Show has been held twice under the auspices of the ROK Air Force and many symposia have opened under the sponsorship of the Agency for Defense Development. By virtue of these events, a deep interest in the aircraft industry is on the uprise nowadays from all areas of industry, academia, the military, the government, and the people. Building on top of this interest, it is important to establish a long-term development plan regarding the aircraft industry. I would like to present my opinion on the general outline of such plan.

Close Coordination and Support of Government Organizations

Coordination between various government organizations, segments of industry, and academia related to the aircraft industry is crucial. In this area, government-sponsored research organizations should work closely with their counterparts in the private sector, bringing together expertise in R&D from the public sector and production processes from the private sector. Determinations of policy direction should be made after earnest discussions and, when taken, policies should be appropriately guided. It has always been the case that because of the diffuse nature of government organization, it is difficult to assess the efficacy of diffuse parts working in conjunction with each other. For instances, budgetary matters are under the Ministry of Finance and Economy, manufacturing is under the Ministry of Trade, Industry and Energy, military procurement under the Ministry of National Defense, commercial aircraft production under the Ministry of Construction & Transportation, and commercial aircraft R&D under the Ministry of Science and Technology. The simultaneous involvement of all of these elements increases the probability of unnecessary complexity and highlights the necessity of close cooperation between these government departments. Along with the high degree of investment called for in the development of the aircraft industry, this diffuse involvement by the government can

also be an obstacle, hampering efficient allocation of limited capital and human resources.

Promotion of International Cooperative Joint Development Efforts

One difficulty with the effort to develop an independent aircraft capability has been the need to engage in extensive R&D at high costs and at the same time to rely on subsequent demand to offset these costs. Relying solely on domestic demand is not feasible since domestic demand will never be high enough to allow for production on a scope that would allow production to take advantage of economies of scale. Therefore, one imperative has been to engage in joint cooperative efforts both in R&D and in increasing demand. A recent tendency in the global aircraft industry has been the growth of civil-military dual use technology, reflecting the overall reduction of demand in the military sector. Mergers and acquisitions (M&A) or constructions of international cooperative consortia are being actively formed to share the burden of risks and to broaden the scope of target markets. Recognizing these aims, European countries embarked on this sort of endeavor over 30 years ago, and this model is now being emulated all over the world.

Expanding Offset Programs for Buildup of R&D Capability

Offset programs are a unique feature of foreign procurement practices and have been an effective means to obtain the transfer of technology from abroad. Korean research institutes as well as industry have benefitted significantly from these programs and have been able to gain wider access to advanced technologies through them. The Ministry of National Defense of the ROK has encouraged the use of offsets in purchase of foreign military equipment since 1983. For example, in the case of KF-16, the offsets related to the production of forward fuselage contributed to enhancing the manufacturing technologies. From an operations standpoint, purchasing technologically proven weapon systems is preferable to opting for domestic licensed production or complete domestic development. Though there are some negative aspects of offset policy, overall significant benefits are possible through this mechanism and better use of this will make

significant contributions to the domestic development of aircraft production capabilities.

Dual-Use Civil-Military Technologies

For a developing country such as Korea, with its limited economic, personnel, and facilities resources, the policy of expanding dual-use technologies which can be applied both in civil and military fields is of utmost importance. The focus of this policy is to "spin on" technologies already existing in the civil area to be transferred to and utilized in the military area and, at the same time, to "spin off" existing military technologies to be released to the civil area to the greatest extent possible. For unavailable technologies in both areas, cooperative efforts to develop them are desirably undertaken, which is to "spin up" the technology. By pursuing this, maximum achievement with low cost can be expected. Dual-use technology promises benefits in all sectors, but it is in the aircraft industry where the benefits are most promising due to its attribute of strong spillover effect to other areas.

Dual-use technology has been touted as the lifesaver for the defense industry as a whole, particularly since the global reductions in demand caused by shrinking defense budgets and the end of the Cold War. The United States has maintained a policy of encouraging spin-offs and commercialization of technologies related to defense, energy, and space into the civil sector. The U.S. Department of Defense is currently executing a plan to revise military specifications with the intent of broadening access to economically more beneficial industrial bases. The plan promotes greater use of performance-based specifications and commercial-type specifications and standards.

Authorizing Capability for Quality and Airworthiness Certification

As Korea aims at becoming one of the leading aircraft countries in the coming decade, it must establish a quality authorization system and engage in the international Bilateral Aviation Safety Agreements (BASA), which is required for type certification, production certification, and airworthiness certification for aircraft it develops. This is

important both because aircraft have to provide a measure of assurance regarding safety and reliability, and because authorization for the import and export of such aircraft requires such a government-level agreement. In the leading countries, the cost expended for quality assurance reaches as high as 15 percent of the total development cost. The entry into BASA usually takes so many years that government support for early preparation of the necessary policies is essential.

Role of the Air Force in the Growth of the Aircraft Industry

The domestic aircraft industry of Korea has been developed by the military rather than civilian sector. Beginning with depot maintenance and licensed production of military aircraft, the recent development of primary (KTX-1) and advanced (KTX-2) training aircraft for the ROK Air Force constitutes the primary source of our aeronautical technology advances. In this sense, the ROKAF may be said to have played a leading role in the development of the national aircraft industry, and such a role will not change in the future. If anything, the role of the Air Force will be even more prominent in the future due to the ever-increasing importance of high technology and air power in the evolving nature of warfare.

Alvin Toffler, a science futurist, anticipated in his book, *War and Anti-War*, that war in the 21st century would feature information warfare driven by rapidly evolving science and technology. The features of the future war have already been emerging through the Gulf War and the latest Yugoslavian conflict, which have been referred to as "clean wars." Due to highly advanced aeronautical and electronic technologies, the two wars have distinctly demonstrated that an independent operation of air power alone may be the thrust of future conflicts. This is breaking up the old notion that air power is a means of supporting the ground forces and that war can be terminated only by successful ground operations. Air power can now be used as a key instrument of war suppression in peacetime, as well as a political means of submission in a conflict situation. In wartime, air power will become the primary instrument of damaging enemy strategic sites. For this reason, many countries around the world nowadays are concentrating their effort more on reinforcement of air power, while providing strong support to R&D of new weapons systems.

Korea cannot afford to be unprepared for the high-tech warfare of the future. Yet it is becoming more difficult to obtain more advanced technologies at a time when technology protection regimes are being strengthened and countries are placing stricter controls on export licenses and the flow of strategic weapons. In addition, inadequate R&D and a shallow domestic production base pose even more difficulties in maintaining technological preparedness. At the present time, Korea is subject to rigid controls on technology transfer from the United States in the form of the Missile Technology Control Regime (MTCR), the Critical Technology Plans (CTP), the International Traffic of Arms Regulation (ITAR), and others. In light of these controls, and also of the need to maintain an adequate level of technology for national defense, it is imperative for Korea to develop independent R&D capabilities. Though R&D requires significant risk and investment in terms of financial and other resources, this is a much more feasible path than continuing to rely on technology borrowing. By simply acquiring advanced weapon systems from abroad, we would only be meeting immediate needs of building up our military resources but constantly deepening our dependency on outside sources for technology. Although direct importation of weapon systems does have some advantages, such as in proven capability and joint operation with friendly countries, this situation would only work to exacerbate our dependency on borrowing from abroad for weapons operation and development.

This growing dependence on foreign suppliers also worsens our ability to negotiate when acquiring subsequent weapons from abroad, since a deepening dependency will, over time, restrict the number of viable suppliers. This in turn tends to negate the benefit of acquiring at the lowest cost, which was originally one of the benefits of direct acquisitions from abroad. In emergency situations, reliance on direct imports also poses a serious threat since availability of demanded weapons or support equipment might be jeopardized. Weapons exports are often severely restricted or banned in cases of conflict or when such exports are made to conflicting countries. Over the long run, an air force relying on direct imports of state-of-the-art weapon systems without an independent R&D capability can not be regarded in fact as a reliable or stable arm of national defense.

Within the total military budget for the Republic of Korea, a mere 3 percent is allocated to R&D investment. This investment is quite low

compared to levels seen in advanced countries, not only in percentage but also in absolute terms. Due to the current economic climate, it is difficult to expect any near term increase in defense spending. Nevertheless, a long-term policy regarding the development of defense technology is necessary. Aside from budgetary increases, other elements of such a long-term policy would include diversification of sources of import, active pursuit of international cooperative development, and continued emphasis on dual use military-civilian technologies. On a fundamental level, the bedrock of defense procurement policy should be a stable approach toward R&D.

CONCLUSION

In conclusion, to revitalize research and development on the aircraft industry of Korea, the following political considerations must be recognized:

- First, there must be renewed recognition of the noneconomic aspects of the aircraft industry. It is necessary to approach the promotion of the aircraft industry not just with a view of economic value but also recognizing the national security dimension. If only the economic value and investment were considered, governmental direct action would not be immediately required.
- Second, it is necessary to recognize that the aircraft industry has certain beneficial externalities such as enhancing national prestige. Thus an overall evaluation of the industry cannot be limited to a quantitative judgment alone. Competition in the aircraft industry during the coming 21st century is expected to be fierce, and questions will abound with respect to returns on investment and the assumption of substantial risks.
- Third, promotion of the aircraft industry should be undertaken in close connection with other industrial activities, while government support should follow the promotion of the aircraft industry with a view to attaining fundamental capabilities for the aircraft development. As mentioned before, the aircraft industry should be promoted within the framework of a fully supported national aim to nurture a strategic industry. It is still too early to

say that the aircraft industry is mature. Government policy and continued substantial investment is still necessary to advance development.

- Fourth, the full support of the Republic of Korea Air Force is necessary since it continues to play an important role in the growth of the aircraft industry and in particular makes contributions in research and development. Since the successful growth of the Korean aircraft industry still depends mainly on demand from military aircraft development, the need of the ROKAF in terms of new projects and meeting new threats will translate into a continued need for R&D as well as product demand. Ultimately, R&D and meeting these demands will translate into greater power for the ROKAF. In order for this cooperative effort to take place, the ROKAF must provide a coherent plan that both addresses the needs of the present domestic aircraft industry and meets potential threats to the nation's security.
- Fifth, continued stable demand both in the short and long term are necessary to promote long-term accumulation of technology and to foster investment in basic R&D. If we fail to pay attention to technology accumulation on the grounds that demand by the ROKAF alone does not justify such long-term investment, we will nullify all of the gains made thus far. Though the scale of its demands may not be large, the ROKAF has made significant advances by demanding sophisticated high-tech weaponry, and will continue to do so in the future.
- Finally, air-based weapon systems are an important core military component in a modern war. The aircraft industry is going to be an important basis of that system, while simultaneously playing a role as a high-value-added and technology-intensive industry. Korea recently became an OECD member country. But the Korean aircraft industry is still technically inferior compared to an industrially advanced country because we have neglected investment in that area for the last 30 years. Presently, it is urgent to invest in research and development in order to stand on a more equal footing with our fellow OECD member countries. Investment in research and development is investment in the future. Demand for research and development cannot be met if our focus is limited to immediate short-term interests, nor can

we achieve long-term expansion if we lack a national focus on clear objectives. It is my earnest hope that we have learned from our mistakes in the past 30 years and that now we will take adequate measures to prepare for the coming century.

**U.S. AEROSPACE TECHNOLOGY AND IMPLICATIONS
FOR KOREA**

Natalie W. Crawford

Perhaps the most striking difference between the aerospace industrial base in the United States and that in Korea is that in the United States aerospace companies have a strong commercial business base and do not rely solely on the military for business. In fact, the U.S. Department of Defense is not always the customer of first choice; however, there is mutual reinforcement between the commercial and military/defense sectors that is very positive in these companies. Another difference, which Korea is experiencing to some extent, is an extraordinary consolidation of aerospace companies. One should be concerned that, if unchecked, consolidation can lead to monopolistic situations that will affect cost. Furthermore, at least as worrisome is the prospect that competition of ideas will be lost or slowed, hence limiting progress.

Korea needs an aerospace industry that has both strong commercial and military components. The synergy that arises from such a combination has the potential to produce quality products more efficiently and at lower cost. It can also provide stability for the workforce in that it does not depend on the vagaries of either the commercial or military/defense sectors, but can strive to balance the business, and hence the workforce.

There is much rhetoric these days about the “revolution in military affairs.” In fact, the phrase has been used so much that it is essentially a cliché. The label is not what matters. What matters is what problems need to be solved and what technologies can enable solu-

tions to the problems. Whether it is technology evolution or revolution or technology aggregation or technology maturation or whether it is technology development or engineering does not matter. What matters is how to identify and solve the problem best and at a reasonable cost.

The word “revolution” evokes an image of rapid change. In fact, the changes that we point to as revolutionary have really occurred over a fairly long period of time. True breakthroughs occur infrequently. Information technology is an exception—we see major changes in processing speed, memory size, and the like occurring in months, not years. But not all technology is like information technology. For example,

- the transistor was invented over 50 years ago, yet it is the foundation of modern computer technology
- the first object-oriented computer languages were invented three decades ago, and are the foundations for today’s languages
- laser technology investment began 20–30 years ago, and has been applied in laser-guided bombs and the Airborne Laser program
- laser-guided bomb concepts were demonstrated 30 years ago
- the first U.S. satellite was put into orbit over 30 years ago, on the 13th try
- the Global Positioning System (GPS) was born over 25 years ago
- rocket propulsion, inertial guidance, and small-warhead designs that evolved decades ago enabled the ICBM.

The point is that it takes time to develop most technologies and to demonstrate their value as enablers to solve problems. It’s not a clichéd name; it is being able to achieve or enable a military capability not before possible—affordably—and to significantly alter the measure-countermeasure equation in your favor.

There are several key U.S. and U.S. Air Force technology investments that are shaping the U.S. Air Force of the 21st century and that can affect Korea’s military capability. Some of them are:

1. GPS—for targeting precisely using differential methods; for air traffic control—locally and worldwide—making aircraft operations more efficient and safe; for enhancing all-weather, precision-target attack; and for precision timing.
2. Commercial satellite communications (SATCOM)—to fill needs beyond specialized military communications, including bandwidth on demand. It will be driven by commercial industry and provide great opportunities for partnering, but the military users need to make their requirements known early so that a good partnership can develop.
3. Commercial remote sensing/imagery products—to enable lower-cost product development for many applications and reduce infrastructure costs. The products are widely available to both allies and adversaries but must be used with care because images can be altered.
4. Smart munitions—small smart bombs enable performance of large weapons in small sizes, enhancing range/payload characteristics; area weapons (submunitions) can discriminate among vehicle targets and detonate accordingly (Low-Cost Anti-Armor Submunitions [LOCAAS]); standoff weapons can extend range and/or enhance survivability (e.g., Joint Acoustic Surveillance System Model [JASSM]).
5. Airborne laser—a critical element of layered theater missile defense, providing both boost-phase intercept and battle-management information for other layers.
6. Unmanned air vehicles (UAVs)—for intelligence/recce/surveillance (e. g., Predator, Global Hawk). Command and control (C2) and formation control are still developing. UAVs are an important complement/supplement for manned and space-based Intelligence, Surveillance, and Reconnaissance (ISR); communications relay.
7. Space-based systems—primarily communications and sensors today; synthetic aperture radar/ground moving- target indication (SAR/GMTI). Don't go to space just because it's there; we must continue to strive to understand protection issues as well as policy and legal issues surrounding denying use to others; continuing R&D is critical to meet performance needs affordably.

8. Manufacturing technology—methods that significantly reduce labor reduce cost; reliable, repeatable manufacturing and interleaving commercial and military parts on the same production lines reduce infrastructure and overhead costs.
9. Distributed training—using simulation and simulators as well as flying can make some training more effective and reduce some costs, but there is a limit; we're still learning. Training cannot be overemphasized; great equipment without adequate training is a fool's investment.

It has been said that U.S. military, and particularly U. S. Air Force, technology development and application are proceeding at a pace so rapid that soon our allies will have little or no interoperability with the U.S. military. Clearly there are exceptions to this—most recently in operations in Bosnia and Kosovo, for example. However, if unchecked that could become the case. It is important that we all understand what capabilities and effects are needed to meet the national security demands of our alliances and our own nations. Everyone cannot afford to do everything. The challenge to all of us is to determine where to make our individual and collective investments to enable our individual and collective security. It is particularly important to strive for interoperability in command, control, and communications (C3) for planning and execution.

In any event, we must think of what operational capabilities can be enabled by military (and possibly commercial) systems. The taxonomy of this analysis, often called strategy-to-task, requires a breakdown of the problem into objectives, tasks, and the implied operational capabilities/systems. However, one should take care to not think of *things* first; rather they should be the product of a strategy-to-task thought process.

What strikes me is the degree to which the ROK is willing to consider the possibility of the U.S. presence in Korea being reduced in the future. No one knows what the future holds, but one must realize that when Korean unification occurs, or as it occurs, all military alliances and presence will be rethought and debated because of regional dynamics—in all dimensions. While it is prudent planning on the

part of the ROK, it is very costly to go it alone. In fact, going it alone could result in unintended instabilities and perceptions of an arms race. A partnership with the United States must continue in whatever form. This partnership should include an understanding of who will do what, when, and how. And, to be prudent, what hedges should exist.

The conditions at the end of the Korean War shaped today's ROK force structure. This strategy has prevailed for 40 years but is now obsolete. Incrementalism probably won't buy the necessary preparedness. A comprehensive regional strategy must be developed from which a military force structure emerges—for example, with and without North Korea; with varying numbers and types of U.S. forces; and considering the thousands-of-years-old regional dynamics that have precluded a more-cooperative multilateral alliance and force development opportunities.

The sheer size (population), purchasing power, and economic growth make Asia a region of strategic importance that must be reckoned with by the world. Witness the effect of the recent economic crises in Asia felt around the world. Korea is in a strategic position to be a strong economic partner as well as a political stabilizer.

The United States must undertake true long-range strategic thinking about its role in a region still dominated by dynamics that are thousands of years old and that are not well understood in the West. These old cultures have developed the ingenuity, intellect, and work ethic that have not only resulted in survival over many centuries but also armed the populations with the capabilities needed to propel those regional countries into the 21st century. To be a good partner, the United States must strive always to understand the tensions and find ways to act in the best interest of all.

Finally, we must all be prudent in our decisions; the result will be a strong military capability both offensively and defensively. Both the United States and the Republic of Korea must be mindful of how their actions and words may be perceived by others and what intentions those perceptions may imply.

Remember

- Mistakes are made
- Wars kill
- The price is high.